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Spas and the Physical Therapist

Walter S. McClellan, M.D.

Introduction

The United States is rich in mineral water resources. There are over 8,000 mineral water springs distributed all over the country from the Atlantic to the Pacific and from the Canadian border to the Gulf of Mexico. A large majority of these springs have never been developed and made available for use. About 400 of these waters have been bottled for distribution but only a relatively few of them have been utilized for spa development.

The springs have played a leading role in the social life of our nation since its beginning in the 18th century. At the watering places in the Virginias, famous people gathered during the latter part of that century and during most of the 19th. Beverly Springs, West Virginia, was well known then. White Sulphur Springs, West Virginia, was famous, and today one finds there many reminders of the days before the Civil War. In the North, Saratoga Springs was a gathering place for society in the summer season all during the last century, and the famous old hotels of that era are still standing. At Saratoga, the guests used the famous mineral waters of the Congress, Hathorn and other springs.

In this country with its large number of mineral water springs, why are there so few spas? The establishment and development of a spa depends on several factors. First, human initiative, which is necessary to provide the physical plant and necessary equipment, must be stimulated. Second, it must be shown that the mineral water present is of medicinal value, which requires careful study of its influence by physicians observing their patients who are using it. Third, the value of the waters must become known to physicians and patients over the country.

The writer has defined the term *spa* as a place where nature has provided a natural medicinal water, where physical development has progressed to allow patients to make use of the mineral waters both externally and internally and to make use of other associated treatments, and where all the work is under medical supervision. It is easy, then, to understand why the United States with its large number of mineral water resources still has so few spas.

The Spas of the United States

At the present time the writer is assembling information to determine the number and type of spas in the United States. While this survey is incomplete it appears that the number will fall somewhere between 20 and 30. Nearly all were begun by the investment of private capital with the building of a hotel near the springs—using the springs to increase the commercial value of the hotel. In many places the hotel owner purchased the spring and made it available mainly for his guests. As the fame of the springs grew and spread, others built hotels and bathing establishments and physicians began to prescribe the waters for their patients. At some springs this is as far as their development has progressed to date. In other places the value and importance of these natural mineral resources to the health of all people has been recognized and governmental assistance has been utilized in their development.

Spas operated under private management include such important institutions as those at White Sulphur Springs, West Virginia; Hot Springs, Virginia; Warm Springs, Georgia; Sharon Springs, New York; Glen Springs, New York; French Lick, Indiana; Mount Clemons, Michigan; Arrowhead Springs, California, and others. Those developed under governmental control are Hot Springs, Arkansas, where the springs are in the Hot Springs National Park and administered by the federal government; Saratoga Springs, New York, which have been owned and operated by the State of New York since 1910; Thermopolis, Wyoming, which is under state control; and Excelsior Springs, Missouri, which have recently been acquired by the city.

The accommodations for patients vary in number and type from some of the private spas where all patients are cared for in the luxurious hotel of the establishment, thus limiting the use of the waters to those who may be economically able to pay the fees, to such developments as Hot Springs, Arkansas, and Saratoga Springs, where a wide range of living accommodations are available to meet the purse of all classes which fact is accountable for the large number of patients who visit these spas. In fact in the latter mentioned places, welfare patients, after proper certification, may receive treatments without charge.

In the spas of the United States mineral waters of all types are found. A simple classification includes thermal springs such as Hot Springs, Arkansas; Arrowhead Springs, California, and Warm Springs, Georgia, where the water comes to the surface above the usual average air temperature of the locality. These springs usually are lightly mineralized but may contain certain elements, such as arsenic as at Arrowhead, boron in

Medical Director, The Saratoga Spa, Saratoga Springs, New York.

traces, and others as well as radium emanations, all of which may be beneficial in certain diseases. Then there are saline springs where either chlorides predominate as at Glen Springs, New York; Mount Clemons, Michigan, and Saratoga Springs, New York, or where sulfates are the main constitutent, as at White Sulphur Springs, West Virginia; French Lick, Indiana, and Sharon Springs, New York. The bicarbonate or alkaline waters are best represented by Manitou Springs, Colorado. In addition, waters may be characterized by the gases which are found in them, such as carbon dioxide, present in large quantities in the waters at Saratoga Springs, New York, and Manitou Springs, Colorado, and hydrogen sulphide found in large amounts at Sharon Springs, New York; Mount Clemons, Michigan; French Lick, Indiana, and White Sulphur Springs, West Virginia. In many places mixed types of water are found. Salines and bicarbonates may be present in the same spring. Frequently, hydrogen sulphide is found in combination with either chloride or sulphate waters. Iron containing waters are found at many of the spas but there is no place where the development depends alone on this type of water.

The mineral waters are utilized in the treatment of disease either internally or externally. The internal use of the waters is a part of the treatment at nearly all spas. Some of the very strongly mineralized waters cannot be taken internally but at nearly all spas there is some spring which is suitable for ingestion. Externally the mineral waters are used for baths either as an individual tub bath prepared at a proper temperature and regulated as to duration individually for each patient, or in a pool where a number of patients may be treated at the same time. The latter method of administration is best illustrated by the work at Warm Springs, Georgia. Pool work is also a part of the spa at Hot Springs, Arkansas, and is the principal method in use at Thermopolis, Wyoming. The mineral waters may also be used in preparing hot packs for application to local areas of the body and they may be inhaled as finely nebulized sprays in individual units or in rooms.

At all spas additional treatments of a physical nature are available. These may include hydrotherapy, such as douches of various types; massage of all types, including massage under water; electric treatments, including diathermy, short wave diathermy, galvanic and faradic currents; lamp treatments, using infra red and radiant lamps for heat applications and ultra-violet lamps for phototherapy; packs, using either hot or cold water, or hot mud which may be either an organic peat or a mineralized type like the Italian Fango; mechanotherapy, using machines for active and passive motion and for vibrations; and colonic irrigations. Places differ in the number and extent of these accessory treatments which they may provide.

The question may be fairly asked, "What is the need and purpose of the development of facilities of this type?" Facilities available at spas are needed to provide this type of treatment for many patients with chronic disease. There are many papers in the medical journals dealing with the increasing importance of degenerative diseases of the circulatory system. Heart and blood vessel diseases are the leading cause of death in this country, including all ages, and this is particularly true in middle and later life. The use of regular periods spent at a spa where carbon dioxide containing waters are available for use offers the possibility of building up the reserve of the heart and of educating the patients regarding the best way to conserve this reserve when they return home.

In addition, the various rheumatic conditions (including arthritis, myositis, neuritis, and other related ailments) are a leading cause of illness, suffering and loss of time among workers. Spa therapy has aided many of these patients in shortening the period of disability and relieving the discomfort attendant on these conditions.

What has been said regarding disorders of the heart and circulation and rheumatic conditions could be repeated for disorders of the gastrointestinal tract, metabolic conditions, skin diseases and nervous ailments. Important also is the value of these resources for the healthy individual who, in order to preserve his health, may use his vacations to great advantage at a spa where there is opportunity for rest, relaxation, exercise and recreation in pleasant surroundings. It offers a splendid opportunity for these people to have a periodic health examination which is of great value in recognizing and correcting minor difficulties which may be the antecedents of degenerative disorders that usually develop in a gradual insidious manner.

To meet this challenge there is need for all these facilities now available and for the further development of other mineral springs to provide sufficient accommodations for all the people in this country. The annual visit of many people, who are economically able, to the various spas of Europe is an established custom. The very great majority of the people in this country cannot spend the time or the money to make the trip abroad. It is, therefore, important to utilize our own resources, which are the equal of those found in any part of the world, in order to provide for these treatments in our own country.

BENEFICIAL EFFECTS OF SPA THERAPY

The value of spa therapy depends upon the utilization of the mineral waters both externally and internally and upon the program or regime followed by the patient during his stay at the spa.

When the mineral waters are used externally they produce changes in the body in various ways. First, thermal effects are obtained. The bath may be given warm or hot; that is, at a temperature above that of the surface of the body which averages between 92 and 95 degrees F. These baths are soothing, relaxing and pain relieving and are more frequently used in rheumatic ailments. A hot bath may also be exhausting and many patients who are weak from the ravages of their disease will not tolerate them. Baths given at the neutral temperature,—that is, where the bath feels neither hot nor cold to the patient,—do not produce a thermal effect. They are useful for patients where this influence is not desired. Cool or cold baths given at a temperature below the average surface temperature of the body are tonic and stimulating and aid in building up the tone of the muscles and blood vessels.

Secondly, *mechanical pressure* is exerted on the surface of the body by the water in the bath. This pressure depends upon the depth of the water over the patient and upon the concentration of the mineral constituents. A concentrated brine of 10 to 15 percent of solid materials, such as at Mt. Clemens, will exert much more pressure than a lightly mineralized water such as that at Hot Springs, Arkansas. This pressure over the surface of the extremities and abdomen aids in emptying the veins and lymph vessels. This helps the circulation as it brings more blood back to the heart and diminishes congestion and stagnation in the extremities. When this pressure is exerted over the chest it will in some patients produce discomfort and make breathing more difficult. This situation arises most often with cardiac patients

whose reserve is low and who have dyspnea. In this group the baths are given as half or three quarter baths. In the half bath the water comes up to the lower border of the thorax and in the three-quarter bath it reaches the nipple line or mid-thorax. In a full bath, the water covers the shoulders,—only the head and neck being above the water level.

In the third place, influences are produced by the chemical constituents, either the mineral salts or the dissolved gases. The mineral salts, if present in considerable amounts, will stimulate and sometimes irritate the skin. The writer does not consider that they are absorbed in any appreciable amounts. The gases in mineral water, usually carbon dioxide or hydrogen sulphide, are more readily absorbed and there is considerable experimental evidence to support this idea, which has been worked out at different European spas having these types of water. Little is known of what happens to these gases in the body. The carbon dioxide is largely eliminated through the lungs, and the hydrogen sulphide is likely changed in the body and the sulphur excreted by the usual channels.

When taken internally, mineral waters are effective because of their chemical composition providing minerals needed by the body and for stimulation of the gastro-intestinal mucous membranes and because of their physical features which include their temperature and tonicity. Warm and hot waters are quickly absorbed and stir up intestinal activity while cold waters are more slowly absorbed. By tonicity is meant their concentration of dissolved mineral materials. They are designated as hypertonic waters if their concentration is greater than the concentration of blood serum which is roughly 1 percent, isotonic if their concentration is approximately the same as the blood serum and hypotonic if the concentration is less than that of blood serum. Hypertonic waters, particularly those containing sulphates and any magnesium salts, are laxative or cathartic in their effect. These same waters, if taken in small doses, aid in the physiological activity of the liver and gall bladder. Isotonic, and particularly hypotonic, waters are diuretic. The presence of carbon dioxide adds to their diuretic value.

The results from the internal use of a mineral water depend also upon the amount of water taken and the time of day when it is ingested. To produce elimination through the gastrointestinal tract, liver and gall bladder, the waters should be taken when the stomach is empty either before breakfast or one to two hours preceding lunch or dinner. The hypotonic or alkaline waters may be taken during the day at anytime.

In order to obtain the best results from the use of the mineral waters, attention must be given to the regulation of the patient's activity. This has been designated the "regime of the cure." It is outlined by the physician with whom the patient consults at the spa. At the smaller spas the physician may be an integral part of the spa organization but at the larger spas the patients are under the care of private physicians who practice in the place where the spa is located. The physician, after an examination of the patient, outlines the program for him. This program includes the type of mineral water, the quantity and time of day when it is to be ingested, the nature and frequency of the external treatments which may include, in addition to his mineral baths, various types of physical therapy suitable to the condition, the diet, the periods of rest during the day and the type and amount of exercise allowed. This program regulates the patient's activity during the whole twenty-four hours. In this way the patient is able to derive the maximum benefit from his stay at the spa and to learn the value of regulated living suitable to his condition which he may follow in a modified form when he returns home.

THE PHYSICAL THERAPIST AT THE SPA

An important factor in the successful operation of a spa is the personnel. In giving the treatments, people with proper training in the various techniques are required. The actual work is done by a staff of men and women working in cooperation with the administration and the prescribing physician.

Training in preparation of the baths and treatments which utilize the special mineral water at any given spa is best obtained as an apprentice at that spa. The training for massage and other forms of physical therapeutic treatments can best be obtained in a recognized school of physical therapy. It may also be obtained in a good department of physical therapy in a large hospital. In any training course opportunity for practice is important, for no amount of theoretical training can properly fit a person to do this work without the valuable experience gained from the actual work itself. At the Saratoga Spa the practical apprentice system is utilized in training attendants in the preparation of proper baths but no regular training school is in operation. The special treatments are given by workers who have had their training in special schools.

In the actual operation of various spas, two systems are in use. The first may be called the individual system. Here the patient, on coming to the bathing establishment, is assigned to an attendant who administers all treatments prescribed for that patient. This attendant, therefore, must have experience in the administration of all types of treatment given at the spa. In such an arrangement the individual attendant must allow forty-five to ninety minutes for each patient and therefore cannot care for more than six to ten patients per day. It is apparent then that the number of attendants can easily be determined if one knows the number of patients to be treated per day. It is also desirable for the patient, as he comes in contact with only one person during his treatments and if he desires to give any gratuity to the attendant it is a simple matter. Such a system is practical for small or highly specialized spas when the total number of treatments may not exceed 200 per day.

The second system might be designated as a classified service where each attendant performs one type of treatment. One person administers the mineral bath, another gives the cabinet and hydrotherapeutic treatment, another gives massage and packs, another the electric treatments and ultra violet light treatments and still another the colonic irrigations. With an organization of this type it is possible to utilize people trained for one type of work who may not have had the opportunity or the ability to obtain training in the general field of physical therapy. This more particularly applies to the preparation of mineral water baths. The other treatments then can be given by people with a broader training in physical therapy. This system is practical in the larger spas where more than 200 treatments are given daily and it also permits better service to a varying load where the number of treatments may differ as much as 500 from day to day. In this way the patient, who requires special treatments in the larger spas such as Hot Springs, Arkansas, Saratoga Springs, New York, Sharon Springs, New York, and others may have an expert attendant for each treatment. In these places 1,000 to 4,000 treatments may be given in one day during

the height of the season. It may not be as pleasant for the individual patient who will in one day receive treatment from two or three different attendants. In the large spas where there is a variation in the cost per treatment depending upon the type of accommodations where the treatment is given, it is necessary to use this classified type of service in order to reduce the expense of operation, for an experienced attendant in giving mineral baths may, with adequate equipment and facilities, administer 50 to 60 such treatments in a day.

The relation of the physical therapist to the patient is important, as he can do many things to send the patient out satisfied and benefited by the treatment. The personality of the attendant plays a great role as well as the expertness of his administration of the treatment. In this work cheerfulness, pleasant expression, intelligent conversation and courtesy are fundamental in establishing the pleasant contact with the patient. No patient likes to be met by a scowl or by an attendant complaining about the way he is being overworked or about how someone else had more patients. Patients differ greatly in their desire for conversation, some wishing to talk and ask questions during the entire treatment and others preferring to remain quiet. The attendant must sense these desires, and it is helpful with the conversational patient for the attendant to answer questions accurately about the institution and its work and have sufficient knowledge of world affairs, political activities and current events in order to meet the patient in a pleasant way. For the patient who does not desire to talk, the attendant must avoid conversation which may even irritate the patient. Courtesy to patients whether they are rich or poor is a virtue. The writer realizes that some patients by nature or because of their illness are unreasonable and very exacting in their demands but this is no reason for any attendant to be discourteous. If any difficulty arises the attendant should refer it to the supervisor who many times can arrange the difficulty to the satisfaction of all.

In addition to the personality of the attendant, the appearance is an important factor. Attention to the hair, which must be neatly combed, and to nails to avoid accumulations of dirt adds greatly to the favorable impression made on the patient. Neatness and cleanliness of uniform which should be made of some white material and of a type easily laundered and suited to the particular work of the attendant should never be overlooked. The person working in hydrotherapy departments must use sheets neatly arranged so they may be quickly changed when wet. All of these factors which are practically always taken for granted play a large part in making a good impression on the patient and indicate the standing of the institution.

The attendants are a vital part of the organization and their cooperation with each other in carrying on the work and with the administrative staff plays a large role in the smooth running of the bathing establishment. The individualist no matter how expert he may be in performing his work may, by failure to cooperate with his fellow workers, create confusion and cause unrest in the staff which then cannot give the best service to the patients. It is vital that the attendant carry out the treatment as instructed by the physicians. If a question arises regarding a bath temperature or other portion of the physician's order which in the opinion of the attendant would be dangerous to the patient, he should report to his supervisor for instructions or to the staff physicians if one is in attendance. The staff physician if he considers it necessary should report by telephone to the physician who sent in the prescription regarding the question. In no case should the attendant change the treatment on his own initiative or discuss the matter with the patient, giving the patient the suggestion that his physician was poorly qualified to direct the treatments. Also it is poor etiquette for any attendant to suggest to the patient that some other treatment would be better for him.

In the relation of the attendants to the patient, to the administration and to the attending physicians' orders, lies the secret of giving satisfactory service to the patients. Their careful cooperation, which aids the smooth operation of a spa, is helpful in providing the most beneficial results for the patients treated.

Unfortunately for the development of a regular staff, practically all the spas of the United States have a marked seasonal variation in the number of patients coming for treatment. In those spas located in the northern section of the country where winters are cold and snow is present, the high season comes in the summer months. This peak is also aided by the fact that summer is vacation time for large numbers of our people. In the central part of the country the high season may have two peaks, one in the spring and one in the autumn. In the southern sections, the winter season is the principal one.

Because of this seasonal variation, it is impossible for the spa to maintain a staff for the entire year and so they employ many attendants for their more active seasons. The physical therapist prefers steady year round work and this type of work is not too desirable. There are many, however, who enjoy living in the South during the winter and in the North during the summer so it is possible to obtain well trained attendants for the peak season from this group of workers.

An exception to this seasonal shift is the work at Warm Springs, Georgia, where the number of patients remains practically constant during the year. In nearly all of the spas, operation is continued throughout the year with a skeleton staff during the low season. In some places like Bedford Springs, Pennsylvania, and Sharon Springs, New York, the spa is closed during the winter.

ADVANTAGES OF PHYSICAL THERAPY CARRIED OUT AT THE SPA

When the patient goes to the spa, he plans to give his whole attention to the correction of his disability. It is possible then to concentrate the treatments and in this way provide the best opportunity for relief and recovery. When taking treatment at home, he may be able to go for his special physical treatment only once or twice a week, making it difficult to build up the proper cumulative benefit from the treatments. It is possible, therefore, at the spa to utilize physical therapy to a good advantage. For some patients where they can stay only three or four weeks at the spa, it may be necessary to continue some form of physical therapy when they return home.

Another point of importance in following out the treatment is the fact that the patients are relieved of home and occupational cares while they are at the spa. The woman does not have to plan daily for the many details of her home. The man or woman regularly employed is thus away from the office and the many interruptions attendant on their business. Socially, the woman does not have her regular bridge parties, club assemblies or committee meetings, and the man, for the time he is at the spa, severs his luncheon engagements and club

responsibilities. The absence of all of these many engagements permits the patient to give primary attention to caring for his condition. It also allows for the development of the program at the spa and the patient can regularly follow out his physician's directions regarding rest periods, exercise, recreation and treatments.

A great advantage of spa treatment is the opportunity for real health education. During the stay the patient learns the importance of regularity in his activities and how he may arrange his mode of living in a better way when he returns home.

For the patient with some physical disability it gives a chance for the physician to teach him the way in which he may best live with his condition. For the healthy person it provides the possibility of a regular health examination. It focuses the attention of the individual on a positive activity; namely, that of maintaining and preserving his health.

There is a tendency in this country for a man to be proud of the fact that he never takes a vacation. This attitude is dangerous for he deprives his mental and physical bodies of the opportunity of building up a reserve so that he can better carry on his work for the coming year. Rather than spending his vacation, if he does take one, in traveling at high speed about the country and indulging in physical exercise of a nature for which he is not trained, this man may spend his one, two, or three weeks at a spa where he lives in pleasant surroundings, has the possibility of regular recreation and checks on his health. In this way he returns from his vacation a wiser man for what he has learned about health and with a renewed energy to assume his duties again.

Conclusions

In conclusion the writer wishes to emphasize the vast natural resources of mineral waters in this country, the great need for the proper development of more carefully planned and correctly managed spas and the education of the physician and the layman in their value in the conservation of health and relief from treatment of many chronic conditions which cause untold suffering and disability for many thousands of our people.

The physical therapist is an important member of the staff of the spa and the importance of the personality, the personal appearance and the personal attention of this individual cannot be overstressed in this large program of spa therapy.

Development of Vermont's Program for the Crippled

Lillian E. Kron

The following four paragraphs, taken from the Introduction to "Infantile Paralysis in Vermont," published in 1924, tell in comparatively few words how the Infantile Paralysis After-care program originated here in Vermont:

"Infantile paralysis, or poliomyelitis, still baffles science as to its cause and prevention; and while not a new disease, having been fairly well described by Michael Underwood as early as 1774, it has occurred in epidemic form only in comparatively recent years. The first known epidemic of any considerable size in the United States occurred in Vermont in the summer of 1894. This was reported by Dr. Charles S. Caverly, President of the State Board of Health.

"Not only was Vermont to be associated with the history of infantile paralysis because of this first epidemic, but later epidemics made heavy inroads upon the comparatively small population of the state, leaving many crippled children to be cared for. This situation became so serious that after an epidemic of 306 cases in 1914, through the efforts of Dr. Caverly and the generosity of an anonymous citizen of the state whose interest he enlisted, a special fund was provided for the study of the cause and treatment of this disease.

"Thus it happened that from being the first state in which the disease occurred in epidemic form, Vermont also became the first to undertake on a state-wide scale the after-care of the victims of infantile paralysis. The special fund, as stated, also provided for research as to the cause and transmission of the disease, and in this field, too, much available knowledge has resulted from the efforts of those carrying on the work.

"No piece of constructive work of any magnitude was ever accomplished by one man alone, but it is usually true that long before the first step is taken the idea has assumed definite form in the mind of one person, who is the leader and inspiration of the other workers. He has seen the need and has caught the vision of the goal to be achieved. Perhaps, as the plans grow and the work develops, it may go beyond the fondest dream of him who gave it its first impulse, or it may never reach the goal which he foresaw. Dr. Caverly did not live to see the disease, against which he had fought so long and so untiringly, really conquered and the fear of future epidemics removed; but he did live to see many of the victims of infantile paralysis in Vermont well on the road to happy, useful, and in some cases normal lives, and to know that real contributions to the knowledge of the disease had been made by those working in cooperation with the State Board of Health under his presidency."

It is impossible in a short account to go into detail about the plan of action, but the names of some of the people who contributed so largely to the foundation and the continuation of this piece of work must not go unmentioned. They are Dr. Charles S. Caverly, Dr. Simon Flexner, Dr. Robert W. Lovett, Dr. Frank R.

Director, Crippled Children's Division, Vermont State Board of Health.

Ober, Dr. Harold L. Amoss, Dr. Edward Taylor, Dr. W. L. Aycock, Mrs. Bertha Weisbrod Allen, and last but not least the anonymous donors, one of whom so generously supported the work for almost twenty years and the other who has supplemented our state appropriation the past few years for special needs.

The program which was formulated, and became widely known as the "Vermont Plan," consisted of three definite divisions: first, an educational campaign for the purpose of giving the medical profession in the state the latest knowledge in regard to the diagnosis and prophylaxis of the disease; second, original research work into the nature of the infection, its methods of distribution, diagnosis and immunity; and third, the treatment of the paralyzed cases.

Dr. Robert W. Lovett of Boston was asked to undertake the treatment of those afflicted. Seeing the cases individually in their homes was impossible, so it was decided to hold clinics in centers throughout the state which would be most accessible to the greatest number of cases. The doctors in the state were notified of the opportunity which had been made available and they, in turn, notified their patients or brought them in to the clinics themselves. Each case was examined by Dr. Lovett; and the physical therapist who accompanied him from his Boston office explained his recommendations and instructions to the parents. That first series of free public clinics for infantile paralysis victims in this country was held twenty-two years ago last December.

Until 1917, the field work was carried on by one of the physical therapists from Dr. Lovett's office on a part-time basis. That summer, however, another severe epidemic occurred and as demands for assistance increased, two physical therapists for full-time field work were secured to supervise treatment in the patients' homes and to assist the doctors at clinics.

Because of the war the work was given up entirely from the summer of 1918 to May 1919, but during this time requests for advice and assistance were continually being received at the State Board of Health. Braces needed repairs or were outgrown; new deformities were developing and old ones were increasing; and new cases needed examination and advice. This interruption proved the value of the work and the necessity of continuing it as part of the State Health program.

With the appointment of a new full-time physical therapist in May 1919, the service again became available. Clinics were resumed that summer with extremely gratifying results, 418 cases reporting at the six clinics. The work has since been continued without interruption, following the same general plan which has included the following activities:

1. Immediate care of acute cases of infantile paralysis in conjunction with the physician in charge of the case.
2. Diagnostic and follow-up clinics.
3. Locating cases.
4. Measuring for, supplying, and repairing braces.
5. Surgical care.
6. Post-operative care in the homes.
7. Follow-up care in the homes of cases who require muscle re-education, etc.
8. Handicraft work.

The handicraft work which was commenced in 1921 is conducted principally for those patients who are so badly handicapped that they are unable to do other kinds of work. They are taught needle work, hand weaving, hooking of rugs, knitting, chair seating, wood working, and other crafts. The finished articles are sold at gift shops, handicraft exchanges, and at private sales, the patient receiving as his share the sale price of the article minus the cost of material. This work has been a boon to patients not only financially but psychologically.

In 1921, through the generosity of another citizen of the state, a school and home for crippled children was opened with accommodations for eighteen children. Its patients derived a great deal of benefit from the regular physical therapy treatments, rest periods, regular, well-balanced meals, and all that goes with an institution of this type. Unfortunately, this part of the rehabilitation program had to be discontinued in 1928.

In time the work increased greatly and was considered more and more an important part of the State Health program, which prompted the legislature to pass a law which became effective in 1933 providing an annual state appropriation for infantile paralysis after-care. Although it was specified that these funds were to be used for infantile paralysis after-care, children suffering from other types of crippling conditions were welcome to attend the clinics for diagnosis and advice. When these cases needed appliances or hospitalization, money with which to carry out the treatment had to be raised for the individual case. However, at a special session of the state legislature in January 1936, an amendment was made to the public laws to enable us to take care of all types of crippled children up to 21 years of age, thereby making Vermont eligible for social security funds. These funds became available to Vermont in April 1936 and with the increase in funds came an expansion of the program necessitating an increase in staff.

The staff now consists of a part-time orthopedic surgeon, a director and assistant director whose field work is supplemented by a third worker (all three Public Health Nurses with physical therapy training), a medical social worker, a handicraft worker, and two secretaries. The work is still under the supervision of Dr. Frank R. Ober of Boston, who for many years has contributed a great deal of time and skill in rehabilitating crippled people in Vermont. The summer clinics are held under his direction, while the spring and fall clinics are conducted by our state orthopedic surgeon.

Vermont does not have a vocational rehabilitation program as most of the states do, but the committee on education is presenting a bill to the legislature now convening asking for an appropriation for this purpose. These funds would be matched by federal money, and it is hoped that such a grant will be made because many people, with this help, could become independent and useful members of society.

Observations by a Pediatrist Concerning Two Types of Crippled Children Frequently Referred to the Physiotherapist

A. Wilmot Jacobsen, M. D.

The treatment which offers most real hope of benefit in many of the infirmities to which children are heir is physical therapy. In order to administer this in the most intelligent way it is necessary that the physical therapist know the essentials of the etiology and pathology of these diseases and also to understand the aims of their medical treatment.

The first twenty years of this century are medically memorable because during this period for the first time three epidemic diseases of the central nervous system swept the civilized world. The first of these was epidemic meningitis which appeared in 1903 and 1904. During this period there were some 25,000 cases reported in New York State alone. Next in 1906 and 1907 came the pandemic of poliomyelitis with 20,000 reported cases in New York State. This took no account of the probable thousands of abortive or undiagnosed cases. Finally in 1916 appeared almost simultaneously in many countries a less severe epidemic of a disease entirely new to clinicians—the so-called "sleeping sickness," which is a variety of encephalitis. All three of these diseases leave a certain proportion of their victims cripples, in need of physical therapy, but by far the most important in this respect is poliomyelitis.

This disease, seen only sporadically before 1906, has recurred in smaller scattered epidemics in this country every year since then. In Buffalo, while the incidence varies widely from year to year, the tendency has been downward as shown by a peak of 300 cases in 1912, another of 150 cases in 1929, and in 1935 a new low of 3 cases. This may be evidence of the development of a "mass immunity" of the population, presumably the result of abortive or subclinical attacks of the disease occurring in a large proportion of the population.

Poliomyelitis is due to a virus which gains access to the body through the nasal mucous membrane. In monkeys, the only animal other than man susceptible to the disease, various types of serums and vaccines have been found to protect against the disease. A live virus, however, similar to that used in vaccination against small pox, is a potentially dangerous substance, and most physicians do not feel convinced that it may not be capable of producing an attack of poliomyelitis when inoculated into a child. For this reason inoculation with live virus is generally frowned upon. On the other hand inoculation with killed virus, which is analogous to the injection of killed bacteria in typhoid vaccine, is a perfectly harmless procedure. Unfortunately, however, there has as yet been produced no definite proof that such inoculation will protect the individual against an attack of poliomyelitis. But experiments are being carried out on a large scale and eventually may prove its worth.

Another method of prevention in time of epidemic has been suggested. The blood of the vast majority of adults is found to contain a substance which prevents infantile paralysis, while in the blood of most children this protective substance can be shown to be lacking. Therefore, injection of adult blood under a child's skin during an epidemic might be expected to protect the child against the disease. Such a procedure was carried out on a large scale several years ago in the city of Bradford, Pennsylvania, and the final tabulation of cases was sufficiently encouraging to suggest that this harmless method be used in other epidemics. Finally, during the past year, a new method of approach to the problem has been devised; namely, the instillation of certain astringent chemicals into the nose in order to attack the virus at its portal of entry. This has been found to be effective in the experimental disease in monkeys, but its efficacy in humans remains to be proven. Thus we may say that while there seems every likelihood that a method of controlling poliomyelitis will someday be developed, as yet no effective means has been demonstrated. Meanwhile the paralyzed victims of this disease will continue to find their greatest hope of restoration to normal function in physical therapy.

Perhaps no group of children is so dependent upon the aid of physical therapy as that comprising the various types of birth injuries. The high incidence of cerebral trauma at birth is not generally recognized. To quote Bronson Crothers: "It is probable that injury of the central nervous system during birth accounts for more than half the deaths of viable babies. Furthermore such injuries are responsible for the disability of more children suffering from organic diseases of the central nervous system than any other single etiological factor except poliomyelitis." Hemorrhage on the surface of or into the substance of the brain destroys areas of nervous tissue, thus resulting eventually in paralysis or spasticity of the muscles inervated by those areas, or by various types of tremor, ataxia and incoordination. An infant that has suffered such an accident at birth quickly develops a certain fairly constant group of symptoms, such as asphyxia necessitating resuscitation, increased somnolence or abnormal restlessness, apneic attacks, irregular breathing, rigidity, yawning, paralysis, failure to suck, and convulsions. The last two symptoms are particularly diagnostic.

The immediate treatment is complete quiet, injection of blood subcutaneously to encourage clotting at the bleeding point, lumbar puncture to relieve increased intracranial pressure and sedatives. If recovery takes place, the child may thrive for about a year at which

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time other signs may become manifest, varying from slight spasticity or a tendency to walk on the toes to complete idiocy. Commonly there is a tendency to stiffen the body, arching the back and throwing back the head. Reflexes are markedly exaggerated. Similar clinical pictures may occur in congential maldevelopments of the brain quite independent of birth injury; and a recent study of children born to women who had massive irradiation over the pelvis during pregnancy revealed 38 out of 75 defective.

Perhaps the commonest type of these spastic children is that known as Little's Disease, or congenital cerebral diplegia. Here the lack of nervous control of the voluntary muscles is manifested by greatly exaggerated movements. In reaching for an object the arm will wander aimlessly. The hand in attempting to grasp something may remain fixed in that position, and it is relaxed with difficulty. In early years the child may learn to walk after a fashion; if so, the gait is quite characteristic,—the toes scrape the floor, the heels are not brought down, and spasm of the thigh muscles forces the individual to move in cross-legged fashion. Speech may be difficult and drooling may reflect against normal mentality. In severe cases the attempt to walk may throw the entire body musculature into a chaos of writhing movements. Yet as long as the mentality remains intact, as it may in even the most severe cases, the possibilities of re-education are unlimited.

We are indebted to Dr. Earl Carlson for careful studies of such children, and at his clinic in the Neurological Institute in New York striking results are obtained. The schedule calls for alternate periods devoted to muscle training and rest. Games and studies that encourage muscular expression are emphasized. A calm, quiet atmosphere is maintained and there is close cooperation with the home. After a preliminary relaxation period, exercises are given to teach the patient to make each movement with a minimum of muscular effort. The child endeavors to make the prescribed movement with the least amount of motor overflow to other muscles than those necessarily used in performing the motion. At the start slow rhythmical movements of major muscle groups are performed, then smaller movements such as walking on lines, placing fingers on dots, and tongue placement before a mirror.

It is important to remember that the birth injured child has *never* been able to perform coordinated movements, a situation different from that which obtains in the case of paralysis acquired later in life where training is a matter of reeducation. In the birth injured it is an attempt to establish patterns for normal coordinated movements from a complex of massive muscular responses which have never been differentiated,—to break up mass action patterns. An example of this type of response is the baby who extends both arms and legs when a toy is offered. Similarly the spastic child spends a large amount of nervous energy in attempts to move a single muscle group. Indeed often the mere thought of moving a finger is sufficient to throw the whole body musculature into movement, and our task is to train this child to make normal movements in the same way we teach a normal child to play the piano. It is a long, slow process, often discouraging, but in the end the physical therapist who has a basic understanding of the difficulty may not infrequently transform an apparently hopeless cripple to a useful citizen.

Comments on the Present Mode and Treatment of a Fracture of the Hip

Frank N. Potts, M. D., F. A. C. S

Some time ago reference was made, and properly so, to an unsolved fracture. This fracture was of the neck of the femur, and it is still unsolved. A great deal of literature has been presented within the past two or three years on treatment by means of internal fixation. It must be stated at the beginning that internal fixation of fractures of the neck of the femur is not new. A great many years ago, the late John B. Murphy advocated internal fixation; some time later, with the advent of the home graft, this too was suggested. None of these measures brought about the desired results. Certainly there could have been nothing wrong in the principle of a firm fixing agent; however, the procedure was a serious one and was not readily accepted.

We owe a great deal of our present knowledge of fractured hips and their treatment to Smith-Petersen. For years, and under great difficulty, he continued to work with his three flange nail. His work was watched with a great deal of interest but was not accepted because of the many technical difficulties attending it. Why has this been an unsolved fracture? Physiologists and anatomists state that it is because of the very poor blood supply to the head and neck of the femur and because of the relation of the main blood supply; they also believe that manipulation can further damage the nutrient vessels. It must be expected that the question of reduction of the fractured fragments has been almost uncertain. Until constant effort was made to get a good lateral view of the fractured elements, we did not know of the relation they bore to each other. The ordinary antero posterior exposure did not show us the shaft in contact with the neck; stereograms did not answer this question. It has been demonstrated of late that good lateral views can be obtained, and they show us a great deal that we did not realize. We get oblique fractures in the neck of the femur; we get comminuted fractures, and we so often find that while the shaft bears the proper relation

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as far as length is concerned, that it is not in satisfactory contact with the neck,—it may be anterior to or posterior to the neck. It seems reasonable to believe that we have not always had good bony apposition following our reductions. With the X-ray technique so improved, we can now determine whether or not we have a complete and satisfactory reduction. This can be done very easily and immediately removes the greatest objection of Smith-Petersen's earliest procedures; namely, an open reduction. Most of these patients are aged and a big surgical procedure such as an open reduction of the hip is a serious one.

With satisfactory reduction, the question of a form of internal fixation depends upon the operator. A great deal of the recent literature would tend to make one believe that this was a very simple procedure. If this view is accepted and if people will persist in stating that this can be reduced and held by a house officer, that the procedure will take but a few minutes, that perfect reduction is not necessary or is not desirable as one author conveyed, then this useful procedure is certain to be discarded.

Pioneers in this type of work are apt to have opinions that are based upon unsatisfactory premises. There is nothing more startling or more gratifying than to see how comfortable these patients are following an internal fixation, and they are not burdened with traction or plaster of paris fixation. Yet this in itself is very apt to distort one's feeling about the procedure. For example, Kirschner wires allow for this pleasant post operative condition, yet they are too light and do bend and break. There are cases on record in which the wire has punctured the head of the acetabulum and entered the pelvis. There are screws used, in a measure like a lag screw, which it would seem must dislodge the capital fragment and which would not have sufficient strength to keep the lower fragment from dislodging. Pins with nuts on them which it seemed desirous to fasten with simple wires, have been used, but certain difficulties were encountered. There are heavier pins with nuts that can be fastened at any point to keep the pin from puncturing still further into the bone. The Smith-Petersen nail has the disadvantage of being difficult to guide. It is difficult to remove and, having cut so much bone, hard to replace if the original position was not satisfactory.

Each person operating this type of case finds an increasing number of hazards to be overcome as he gets a larger series of cases. There is a great fallacy in considering this a small surgical procedure that can be allocated to anyone who is able to drive a nail. If this procedure is to obtain the position that is necessary for it to be an accepted one, then great attention must be paid to the minutest detail. Let one start with the principle that the more perfect the reduction, the better the chance for union. The principles as recently expounded by Leadbetter are correct and if properly carried out should bring about perfect reduction. This can be determined only by an antero posterior and lateral X-rays. This therefore necessitates that this procedure be carried out in a room adjacent to facilities for X-raying and quickly developing the films. The modern portable machines are capable of mobility and excellent penetration. Once having determined that the reduction is satisfactory, one will use whatever material he thinks best for the fixation. It would seem that a material that would not bend and would not drift through to the acetabulum and would not readily be displaced should be the proper substance. The three flange nail or the heavier pins 3/32 in diameter meet these requirements. A pin inserted well down the shaft, going up through the neck, can be felt to enter the capital fragment. Experience facilitates the application of this pin. X-ray examination at that time in the two planes shows whether or not the position of the pin is satisfactory; if it is, then the nail can be driven along parallel to it or other pins can be applied using the first as a guide and having subsequent X-rays made to check the depth of the pins and their location. The wound is then closed and a light metal splint with cross bars placed upon the foot to prevent external rotation. In all probability this splint is not necessary, but it would seem that some form of protection to the injured bone would add to the patient's comfort.

These patients are allowed to sit up in bed the same day or the next day, are encouraged to bend the knee and hip, and the metal splint is removed at the end of ten days; patients are then allowed out of bed.

Avertin and nitrous oxide have proven satisfactory anesthetics in these cases. The nitrous oxide can be stopped during such times as the X-rays are being made and developed, and all in all the patient has very little of this form of anesthetic. In some of the older patients, the procedure has been carried out with avertin alone; at no time has it been necessary for the continuous gas anesthetic.

If we have been able to make a satisfactory reduction of the fracture and have been able to maintain the fragments in juxta position, the two greatest factors in bringing about union have been employed. The post-operative care of these people is greatly lessened, and their mobility does a great deal to avoid pulmonary complications. Whether the internal fixing agents should be removed or not will depend upon the individual case.

How long to keep these people from bearing weight has not been satisfactorily determined. One surgeon likes his patients to walk within two or three weeks; another has stated that he would not allow them to walk short of two years. A proper basis for judging time that a patient could walk could be based upon the X-ray findings,—the trabeculation across the fractured area denoting good bony repair; this, too, will vary with the individual case.

Internal fixation for fractures of the neck of the femur is a means of holding properly reduced fragments in place. Meticulous care in the reduction and application of the fixing agents is necessary. A procedure which holds reduced fractures in place offers great opportunity for bony repair. These patients are immeasurably more comfortable than with any other mode of treatment.

Residual Neuromuscular Hypertension: Implication for Physiotherapy*

Part II: The Scientific Background for a Study of Neuromuscular Hypertonus

Josephine L. Rathbone, Ph. D.

A Review of Some of the Established Truths Concerning the Physiology of Exercise

Unity of the nervous and muscular systems. When considering structure or anatomy, one may study the various units of the neuromuscular system separately; but when considering their function or physiology, it is impossible to separate muscles from brain, spinal cord, motor nerves and blood supply, and to assign to each a separate role. The nervous and muscular systems are one functionally. The exteroceptive and proprioceptive neurons are closely connected with those motor neurons which control the striated muscles. These sets of neurons are grouped together by physiologists and called the somatic sensorimotor nervous system. By means of this system, the body adjusts to its external environment. The interoceptive neurons are closely connected with those neurons which control the smooth muscles and the glands. These two sets of neurons comprise the so-called visceral sensorimotor system, by means of which the body adjusts to its internal conditions. These two functional systems are not actually separate, for, since every afferent neuron has potential connections with every efferent neuron in the cord, the somatic and visceral systems are interrelated. The visceral organs may respond to external stimuli, and striated muscles to internal stimuli.

Although the impulses for action may come from a wide sensory field, it appears that there is only one final motor nerve pathway to each glandular or muscular unit. Sherrington has called this terminal nerve "the final common path." It is clear, however, that reflex as well as voluntary responses are complex. They cannot be mediated through a single muscle but by a coordinated balance between the activities of groups of antagonistic and synergistic muscles.

Degrees of muscular contraction may be measured in many ways: by mechanical work, by chemical change, by heat production, by electrical response, and by sound. In the first part of this article will be reviewed certain scientific facts and theories as they pertain to an explanation of residual neuromuscular hypertonus.

Mechanical work. By attaching an isolated muscle to a lever and allowing the latter to come in contact with a moving surface (smoked drum), one may secure a graphic record of the mechanical work of a muscle in contraction. It is found to consist of three phases—a latent period, a period of contraction, and a period of relaxation. The latent period is due to changes which occur before actual shortening of the fiber is possible. The contraction period is the time during which the fibers are shortened, and the relaxation period is the time during which the fibers are returning to the original strength. Such a graphic representation of a single twitch is called a myogram.

Accompanying a series of repeated stimuli, the first few muscular contractions progressively increase in extent to a maximum—treppe—after which the responses soon become less and less effective as "fatigue" develops. When the stimuli are applied rapidly, the muscle may be held in a state of continuous contraction or tetanus. The importance of tetanus lies in the fact that practically every voluntary or reflex response in man is of this nature.

Although the mechanical response of muscle to normal innervation appears continuous and maintained because the rate of neural discharge is rapid, the internal response is discontinuous, because immediately following a response to a single stimulus there is a period, as it were, of forced rest or a period of adjustment during which the muscle is non-irritable and fails to respond. This refractory period, so-called, serves as a means of protection to the muscle against a demand which is beyond its capacity.

A muscle contracts when it is loaded, or "on stretch." When the load is reduced to zero, the muscle will not contract. "When the load becomes so great as to be just beyond the power of the muscle to move it, absolute power of the muscle, no work is done although the muscle is expending considerable energy in developing tension in an attempt to lift the load."[1] Hill points out that "if a muscle attempts to move a load which is too heavy for it, it will do no mechanical work at all, but will use the same energy as—indeed more energy than—if it were actually accomplishing work."[2] Between the extremes of no load, and too much load, "there is a load which, when multiplied by the height to which it is lifted, will give a maximum product of work. This is known as the optimum load, and varies from muscle to muscle."[3]

There is an optimum time as well as an optimum load for muscle contraction. "If the movement is performed very slowly, the muscular contraction has to be maintained for a relatively long time, and this involves increased energy expenditure and decreased efficiency. On the other hand, if the movement performed is carried out very rapidly, energy is wasted in producing a rapid change of form in the muscle and this again decreases the efficiency."[4] The most efficient contraction of muscle occurs when the load is optimum and the time optimum.

Chemical changes. The wear and tear of a machine are entirely due to the frictional forces between materials which have no relation to the fuel of such a machine. In the living cell, however, structure and fuel are essentially similar materials, and no wear and tear can take place without some actual changes in the structure of the machine. In living tissues the changes are chemical. The understanding of these changes is none too simple.

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In fact, the subject is still open to controversy. The stages of muscular response apparently are as follows: (1) stimulation, (2) an exothermic chemical reaction, producing (3) contraction and relaxation, and then (4) recovery.

Oxidation apparently takes place only in the relaxation phase. The conversion of glycogen, during the contraction phase, into lactic acid is a non-oxidative reaction and occurs irrespective of the presence or absence of oxygen. In fact, a muscle will continue to contract for an appreciable time in the complete absence of oxygen because of the fact that lactic acid is quickly neutralized by certain alkaline bicarbonates, phosphates and alkaline salts of the muscle proteins, known collectively as the muscle buffers. They are to be found in the blood and lymph as well as in the muscles. During mild or even moderate activity, "the acids are neutralized by the buffers of the tissues and body fluids as rapidly as they are formed. During more severe and prolonged activity, however, the buffers reach the point of exhaustion and the muscles become slightly acid in reaction."[5]

"The oxygen is used after the exertion is over, in effecting a restoration of the system to its previous condition."[6] "In the absence of the oxidative phase, the acid accumulates in the muscle and stops the working of the muscle machine; that is to say, fatigue occurs."[7] Probably the maximum oxygen debt to which the body can submit depends upon: "(1) the amount of alkali available to neutralize the acid in the protein 'buffers' of tissue and blood, (2) the rate at which the lactic acid is liberated, . . . and (3) the resolution of the subject in pressing his body to exhaustion."[8]

As a final sign of fatigue, there will occur a speeding up of respiration and circulation in order to bring oxygen to the tissues and to get rid of the oxygen debt of the whole body. The respiratory distress will probably not occur for some time after the acid has been liberated because respiratory distress is largely due to acid acting on the nervous system. In cases of accumulative or chronic fatigue, the respiratory distress and circulatory disturbances are often quite apparent. When they are relieved, the sense of greater comfort is marked.

Heat production. Heat is produced at every phase of muscle contraction. By using sensitive thermopiles and string galvanometers to convert the heat change into an electrical change which can be measured quantitatively, it has been possible "to demonstrate a large production of heat during the development of the contraction, a continued production of heat during the maintenance of the contraction (tetanus), and another rather large and rapid production of heat during the relaxation. Furthermore, there is a delayed heat production which occurs after the relaxation phase has come to an end."[9]

Muscle is not a heat engine and once the energy appears in the form of heat it becomes of no further use in the energetics of muscular contraction other than to influence the general rise of temperature, which produces favorable effects upon the inherent bio-chemical reactions involved. Heat "within certain limits accelerates all phases of the muscular contraction; the latent period is shortened, the rapidity and effectiveness of the contraction are increased while the relaxation phase is especially accelerated. Cold has opposite effects."[10] "The most favorable temperature for muscular activity is about one degree above the normal body temperature."[11]

Summary of the mechanical and chemical phases of muscular contraction. Before going on to a discussion of the measurement of muscular contraction by electrical and auditory methods, it will be well to look back over the preceding pages to ascertain what points should be kept in mind particularly, so that no factors will be neglected in the study of clinical cases of residual neuromuscular hypertension.

Since the visceral and skeletal neuromuscular systems interact on each other, it will not be strange if incorrect or over-use of one shows in the other. If the muscular system is hypertense, for example, it will be logical to look for signs of hypertension in the viscera.

If the excitations from all over the body react on each muscle fiber through its common final path, and if one excitation can be superimposed upon another, so augmenting the muscular response, it will be interesting in each one of our cases to find out how this augmentation can be cut down, and what activities are the unnecessary ones—the ones which should be eliminated in the interest of the whole.

Since muscles contract when they are loaded, it will be necessary to discover what positions or attitudes our subjects are maintaining to the increase of their reflex muscular contractions as the result of loading. Also, it will be interesting to observe whether they, in their daily occupations, perform slow movements or are permitted to keep up an easy rhythm.

After the above explanation of mechanical work, we shall not fall into the error of thinking that only that activity which results in movement is costly. We shall not say that mental fatigue is not real fatigue, because the physiologic changes are too slight to be measured by the crude methods available in some laboratories.

We shall aim to increase the buffering effects in all our cases; shall try to increase our subjects' utilization of oxygen; shall help to improve their circulation in order to remove the toxic end-products of muscular contraction and to bring the substances of repair; and shall not let the body temperature fall below normal.

Electrical change. Because it has been difficult to analyze all phases of muscular fatigue by mechanical and chemical methods, students of the subject have welcomed the newer electrical methods. Changes in electrical potential of tissues immediately surrounding contracting muscle may be measured by deflections of a galvanometer needle connection to a pair of electrodes placed upon the skin overlying the muscle or inserted directly into the muscle.[12] The change is called the current of action. "The output of electrical energy is quite negligible, however, relative to the total energy, but its appearance is indicative of activity and has been of invaluable assistance to the physiologist in the study of muscle, nerve, and other forms of active tissue. It is associated with excitation generally or with those changes which occur in the muscle preceding the mechanical response."[13] The electrical response can be taken as an indication of the fundamental underlying processes and may be found efficient in detecting degrees of contraction which cruder chemical methods overlook.

Sound. It is possible that a more accurate technique may be developed in the future to study degrees of muscle contraction by sound recording devices. It is already known that if one applies a stethoscope over a contracting muscle, one will hear a musical tone. "The sounds are produced by the vibrations set up in the contracting muscles. The pitch of the sound heard corresponds within certain limits to the number of stimuli entering the muscle per second and consequently the number of muscular responses. The production of sound can also be demonstrated in a contracting muscle by means of a microphone and amplifying tubes."[14]

Tonic versus phasic contraction of muscle. In order to bring about coordinated movements and to accomplish

held attitudes, it is necessary for muscles both to move segments of the skeleton, and to hold segments stationery. In other words, muscles may contract in response to stimulation; or they may maintain a contraction in response to stimulation. The first form of action is called "phasic" or "kinetic"; the second is called "tonic," "static," or "postural" contraction.

Both forms of contraction are seen more and more clearly to rest upon the same essential integrated activity of muscle, nerve and nerve center. "Postural tonus is simply part and parcel of ordinary motility; a manifestation of that ordinary rhythmic neuromuscular activity by which are executed all our reflex and other acts involving the skeletal musculature."[15] "There is no hard and fast line between the stimuli capable of exciting tonic and phasic activities in the muscle."[16]

As to the physical changes which occur in tonically and phasically contracting muscles, there seems to be no differences except in the degree of shortening. As to the chemical changes, tonic contraction as well as phasic is caused by the same metabolites. Although the augmentation of respiratory exchange is much less during tonic contraction than during phasic movements, it still exists.[17] The tonic or reflex postural form of activity, "because mild and static, involves relatively little expensive metabolism, and is little liable to fatigue."[18] Since tonus involves relatively little expensive metabolism, it rarely passes the physiologic stage of hypertension. Yet, it is this stage of hypertension which is of the most interest to students of human behavior.

Theories of nervous excitation. All muscular effort —either phasic or tonic—involves nerve control. Gradations of response, from mild tonus to maximum contractions, may readily be achieved by a variation in the rate of discharge from the central nervous system.

Nerve fibers have no other function than that of conveying excitations. In the nerve fiber, "the energy, whether it be electrical or chemical in nature, is developed in the fiber itself from one point to the next as conduction takes place along it and is not dependent upon the energy arising from the stimulus which initiated response."[19] The stimulus serves to arouse locally in the nerve fiber the series of internal changes which are fundamental to nervous conduction, and as soon as the change developed in one local area reaches a certain threshold it excites the area just ahead; and so the excitation is conveyed. The active process is of brief duration and disappears spontaneously after a certain very brief interval.

In all cases, the impulses reaching the muscle fibers over the motor nerves are single or in series, since the conduction process in nerves always remains discontinuous because of the refractory state which invariably follows the active state. It has been suggested that probably "the maximum rate at which impulses can succeed each other along a given nerve is limited by the length of the absolute refractory phase of that nerve."[20]

During the active phase of nerve metabolism, certain chemical changes take place and the initial recovery of nerve following a stimulus is accompanied by a liberation of energy in the form of heat, just as is the process of relaxation in muscle.[21] It appears that "not only does extra heat production last long after production is over, but potential or permeability changes may also considerably outlast the transmitted impulse."[22] The dependence of these changes on the presence of oxygen has been much studied, but the results can hardly be given a sound interpretation.

Disturbances in neuromuscular functioning resulting in failure of synchronization. If nerves and their associated muscles are to work smoothly together, their rhythms of conduction and contraction must be in harmony. The causes of the disturbances which upset neuromuscular synchronization are not thoroughly understood, and evidence points to the fact that they are not simple.

Any condition which disturbs the reaction time of the nerve or the latent period of the muscle will produce a change in rhythm between the two. It has been shown that the reaction time of nerve can be lengthened by fatigue, undue excitement or extreme worry; and shortened, up to a certain limit, through practice and training and by increasing the stimulus.[23] The latent period in muscle, being dependent upon the time taken for conduction through the nerve centers or synapses, the rate of conduction in the motor nerve endings in tendon or muscle, and the time of conduction of muscle itself due to its viscous inertia[24] is affected by many factors. It will be necessary to discuss further at this point the actual state of affairs in physiologic fatigue.

Physiologic fatigue. As explained in the introductory article in this series, normal physiologic fatigue means less efficient functional activity. The term refers to changes brought about in the organism by its own exertions, changes which tend to interfere with or inhibit the organism's further activity. It indicates a state of lowered efficiency in the organism, brought about by the expenditure of energy in doing work; and shows itself either in impairment of the quality of the work subsequently done, or in diminution of the quantity, or in both.

It is necessary to consider fatigue in its different stages. If one will turn back to the discussions of the simple muscle twitch and of tetanus, one will recognize certain stages in muscle contraction which coincide with phases of the fatigue syndrome. After the single twitch, a sufficient rest period is necessary before a contraction can be repeated. In tetanus, before the stage of exhaustion, or failure to contract, there is a period of tension. When several contractions are summated, the tension increases until the muscle may be said to be in a state of hypertension prior to exhaustion.

The transient irritability due to reflex hyperexcitation is caused by the same fatigue toxins as eventually cause exhaustion. The accumulation and insufficient removal of the decomposition products of muscular activity lead at first to a transient condition of increased irritability, followed by lessened irritability of muscle cells. The latter state is the one which is usually called "fatigue." It may be stated unreservedly, however, that physiologic fatigue, as estimated objectively, involves two distinct phases: (1) a phase when fatigue acts apparently as a stimulant, and increases efficiency, and (2) a phase of longer duration when the body is attempting to make good its losses.[25] It is the first phase which interests us more.

In the work cycle, the phase of hypertension and the recognition of that phase by the individual is a real safeguard. If the state of hypertension is not heeded, and if physiologic repair is not made possible by cessation of activity and rest, the state of chronic excitability to be discussed in relation to the cases under consideration in this study will result. Remember that hypertension, not exhaustion, is the stage of over-fatigue to be considered the warning of disaster.

The theories as to the physiologic causes of normal and chronic fatigue are numerous. Most investigators agree with Stiles that fatigue is the result of two causes, conceived to be as follows: (1) "the store of energy-producing substance runs low," and (2) the "by-prod-

ucts or end-products of the chemical process which is going on may so accumulate as to become a hindrance to the continuance of that process."[26] In other words, fatigue may arise from exhaustion of the material stored up by living substance, or from the accumulation of the waste products of such activity.[27]

Any respiratory or circulatory deficiency which could restrict the availability of oxygen would delay recuperation from exertion. At least, oxygen is the essential need during the recove phase in order to resynthesize the acid metabolites into their precursors. In listing the limiting factors in fatigue of organic nature, Dill and his co-workers place oxygen supply and rate at which oxygen may be supplied to local areas before supply of fuel, rate at which body heat is dissipated, rate at which fuel reserves are converted into useful mechanical work, and poor neural coordination necessitating excess expenditure of energy.[28] Other facts to be mentioned subsequently will bear out this contention.

Fatigue of the nervous system. Many writers emphasize that fatigue is nervous in its origin even if one uses muscles to produce it. They say that "in real cases of fatigue there is an actual poisoning of the central nervous system through the absorption of fatigue poisons."[29] They are uncertain whether the fatigue is caused by muscle or by nerve changes. It is quite possible that the muscular fatigue observed in laboratory is due frequently not to exhaustion of the power of contraction but to the failure of the process of excitation.[30]

In nervous excitation, as in muscle response, fatigue shows first by heightened response. Just as in muscle response there is a "distinct increase in the amplitude of the waves, indicating that action currents of greater voltage are produced in the fatigued muscles,"[31] so nerve fibers have an increased excitability during the development of fatigue. Furthermore, with the onset of fatigue, the motor cells of the cord tend to fire off simultaneously. This grouping or volleying of higher centers in fatigue may be associated with the development of fatigue tremor.

Actually, tonic contraction is fatiguing out of all proportion to the physiologic changes taking place in the muscle or the rate of responses in the nerves. This effect of tonic contraction may be due to the fact that the circulation is impaired and the utilization of oxygen thereby affected. Efficient circulation of the blood depends largely upon rhythmic contractions of muscles, which by alternately pressing on and releasing the veins aid in the return of the blood to the heart. In states of postural contraction, there is no alternate pressing on and releasing of the veins. Hill emphasizes the difference in the circulation in the two types of contraction by describing the state of oxygen consumption in a runner and in an oarsman. By physiologic experiment he proved that a runner, per kilo of body weight, can consume considerable more oxygen than an oarsman, because in running the movements are rapid and free, while in rowing they are slow and restricted.[32] There is sound evidence to show, moreover, that rowing is more taxing to the body and heart than running, probably because of the circulatory inefficiency and the extreme tenseness of muscles.

Along with the retarded circulation in static or tonic contraction go very definite sensations. Often the extremities feel cold and one experiences sensations of marked discomfort in the regions of the body which are tense. The sensations may not be in the forefront of consciousness, but they are causing responses nevertheless. Witness the way a person rubs a wrinkled brow or shakes an arm which has been held long in one position. It appears logical that many of the so-called "sensations of fatigue" are nothing more nor less than recognitions of residual tension. Since these sensations indicate some degree of muscular tonus, and since muscular tonus can have the same effects on the body physiology as movement, if continued long enough, the sensations of fatigue may be considered as valuable warnings. Even in "mental fatigue" and in "neurasthenia" they should not be neglected.

To summarize, although static effort, as compared with dynamic effort, exercises but little influence on metabolism, the static type of effort is the one which most readily and rapidly induces hypertension and unpleasant feelings of fatigue; and it is this same static component of all muscular effort which determines whether work is considered severe or not. It is the element in muscular activity which must be reduced to the minimum in order to offset discomfort and cumulative fatigue, and the one which must be treated to bring about therapeutic results.

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(Editor's Note: This is the second of a series of articles by Miss Rathbone. The next will appear in an early issue.)

Factors in the Treatment of Dysarthria

Berneice R. Rutherford

This presentation of four spastic cases is an attempt to discover what factors seem to operate to hinder or assist correction of dysarthria. The writer realizes that four is a very small number from which to draw definite conclusions. It seems justified, however, as a start in this field toward larger studies.

Dysarthria is an articulation defect due to lesion in the nervous system. The physical diagnosis on these children does not give the exact location of the lesion. The term "spasticity" or "Little's" is used interchangeably in the diagnosis of complaint of each. All four have learned what walking they do since entering school. G2 walks without assistance; B1 with the aid of a chair, B2 only in a walker, and G1 with assistance of an attendant. G2 had "la" for all words. No one of the other three had speech that could be readily understood. Breathing was labored and uncontrolled in all four cases.

For the psychological examinations, Stanford Revision of Binet Simon and Arthur's Performance Tests were used. The examiner was the same in each case. The first results on G2 were questioned because of the lack of speech and an eye difficulty which was due to the same central lesion responsible for the whole system complex. Later a retest was given (1937) with the result noted on the chart.

Discussion

These children have been in the same grade together, and for the most part together in the same speech group. In physical treatment they have been together some of the time, but more frequently they received their treatment individually, though the type of treatment is the same. Their physical therapy averaged about thirty minutes per day. Their speech work averaged about twenty to twenty-five minutes per day. Relaxation was carried on in both physical therapy and speech therapy. The coordination exercises were for the entire body in lying, creeping, sitting, and standing positions. Balancing was done in sitting, standing, walking, and hopping positions, with and without support. Walking was begun by walking around stationary objects, holding on; then walkers were used, and later crutches, canes, pushing a chair a long distance, personal assistance and finally alone. Under water exercise furthers all this and also assists in control of breathing. Games and other activities continue along this line. We feel that all of this physical therapy materially aids in the general speech improvement.

Specific speech training for this group has been carried on in four ways. There have been lip, tongue, and jaw exercises. Tongue blades and applicators were used occasionally to push the tongue to the corners of the mouth or to lift up the tip; or to give a kinesthetic awareness of certain muscles. B1 and B2 had more difficulty than either G1 or G2. Another phase of training has been for breath control. Many devices were used, such as blowing of feathers and windmills, blowing out candles, and exercises in inhaling and exhaling, and prolonging voice exhalation. This last was of great difficulty for G1. The increases in the sustaining of voiced exhalations were as follows:

B1 nearly doubled in less than one year and more than tripled in four years.

B2 more than doubled in one year, and approximately tripled in four years.

G1 increased less than one-sixth in one year, more than tripled in four years.

G2 doubled in one year and was nearly five times as long a time in four years. As this control increased, smoother and more continuous speech has been observed.

A third phase was an effort to establish a dominant gradient of excitation sufficient to integrate the muscles operating for speech. Such activities as finger painting, crayoning, printing and writing were introduced. Some significant differences appear in this phase. G1 and G2 have maintained the same handedness throughout. B1 and B2 have made several shifts. B1 began as a left-handed child, and during his first three school years he remained the same. In 1936 he announced that it was easier to use the right. Since then he has maintained right sidedness. As far as known, no one influenced this child to change. At present, 1937, the writing with the left hand is very inferior to that of the right hand. He has remained right-eyed throughout. His speech has improved markedly within the last year, and his school work progresses with great satisfaction to child and teacher.

B2 has made more shifts. He started school as a right-hander, although unable to use either one well. In the second and third years he was left handed, but in the Fall of 1935 the left hand seemed more spastic and he was using the right hand again. In the winter the reverse was true. Since that time he has continued using the left hand. During this period of shifting back and forth, his speech showed some slight improvement. The greatest improvement, however, has been during the past year. His eyedness has been left since the first test in 1935.

The fourth phase of the speech treatment has been auditory stimulation. In each case, as handedness shifted, the ear used for stimulation was shifted so that it was in harmony with the hand being used.

All four children attacked the reading and writing problem with equal enthusiasm and for the first year progressed apparently with equal strides. Gradually G2 appeared to be falling behind in scholastic achievement. At present she is not keeping up to grade.

The present status of speech is as follows: B1 does not have as much monotonous, husky garbling of sounds. He still has an occasional blurring "s" and substitution of "w" for "l" sound. B2 has increased tremendously in volume. "sh," "zh" and "s" are still blurred. Otherwise sounds are good. G1 has good speech for the most part. When she gets excited, sometimes, she becomes slovenly in articulation of "sh," "zh." G2, who had no speech but a "la," has loud, exceedingly clean-cut speech. Occasionally "W" sound still creeps in for "ɹ." Any one of the four can now be understood. G1 and G2 have made greater progress, and their speech now is better than B1 and B2.

Speech Clinician, Dowling School, Minneapolis, Minnesota.

	B1	*B2*	*G1*	*G2*
Diagnosis	Diplegia.	Diplegia.	Diplegia.	Diplegia.
C.A. 1/1/37	10 yrs.	10.6.	9.	10.7.
M.A }	5.4 } 9/26/33.	6-10 } 9/21/32.	4-8 } 1/24/33.	*Retest* 5-2 } 1/6/33 7-5 } 2/1/37
I.Q. }	92 }	94 }	92 }	79 } 70 }
Birth History.....	Full term. Womb closed on neck.	Full term, difficult labor, 28 hrs. 3 days of Oxygen. Cord around neck 3 times. Blue baby.	Premature (7¼ mo.). Instruments. 23 hrs. labor.	Full term. Normal as far as Mother knows.
Nutritional History	Bottle fed 1 year.	Bottle, expressed milk and Glucose.	Bottle fed 1 year.	Bottle fed 3 years.
Illnesses or Accidents	Measles.	Scarlet fever at 1 year of age. Very ill.	Chicken pox. Whooping cough, Measles.	Stenosis of stomach (3 mo.), Mumps, Chicken pox, Scarlet fever (9 yrs.), Measles (6 yrs.).
Age at Walking....	Not alone at 10 years.	Not alone at 10.6 years.	Not alone at 9 years.	About 7 years.
Age at Talking	1 year.	Very little up to 6 years.	2½-3 years.	About 7 years.
Eyedness	(1935) R.E.	(1935) L.E.	(1935) L.E.	(1935) Amphi.
	(1937) R.E.	(1937) L.E	(1937) L.E	(1937) L.E.
Laterality History	1933, 1934, 1935, L. H. seems stronger. 1936-37, voluntarily switched to R. H.	1932, R. H. 1933, 1934. L. H. 1935, 1936, 1st R. H. 1937, 2nd L. H.	L. H.	R. H.
Thumbsucking	None.	None.	None.	None.
Strabismus	None.	None.	Yes.	Yes.
Enuresis	None.	None.	Yes (diurnal until 8 yrs.).	None.
Convulsions	None.	None.	Yes.	None.
Position in Family	Only child	Only child	Older of two girls.	Younger of two children.
Family History of Sidedness	Mother L. H. except in writing (was shifted). Paternal grandfather L. H.	Mother amphiocular, paternal uncle a twin—L. H. Maternal uncles L. H. Maternal two cousins L. H.	Mother L. H. Maternal aunt L. H. Maternal grand aunt strabismus.	All right sided as far as known. No strabismus, twins, nor speech disorders.
Date of Enrollment in Speech class	10/11/33 (5 yrs. 10 mos.)	9/19/32 (6 yrs. 3 mos.).	9/11/33 (5 yrs. 9 mos.).	11/7/32 (6 yrs. 5 mos.).
Approximate number of days in attendance.....	275.	280.	277.	290.
Type of Physical Therapy Treatment and Approximate time...	Tank (coordination, walking, preliminary swimming, ½ hr. daily), Coordination and Balancing, Ball Bouncing 2 hands, ½ hr. daily Relaxation.	Tank (coordination, walking, preliminary swimming), Coordination. Balancing, Relaxation, Weaving, Games on R. H. ½ hr. per day.	Tank (coordination, mental hygiene, walking, ½ hr. daily), Coordination, Balancing, ½ hr. daily. Relaxation, Weaving (both hands) ½ hr. daily.	Tank (coordination, walking, preliminary swimming), Coordination, Balancing ½ hr. daily. Relaxation. Ball bouncing (both hands).
Speech Diagnosis	Dysarthria (Articulatory paralytic).	Dysarthria (Articulatory paralytic).	Dysarthria (Articulatory paralytic).	Dysarthria (Articulatory paralytic).
Severity	Severe, s, sh, zh, tsh, f, r, l, h, lips inactive. Breath control monotonous.	Severe, c, g, k, l, s, z, sh, zh, tsh, dsh. All vowels —th, r. Nasal, slushy endings.	Severe, f. v, sh, zh, dsh, l, r, s, z, j, th, d. Omits endings. Slushy. Lips inactive.	Severe, "la" only word.
Treatment Approximate Time	Auditory stimulation. Tongue, lip-jaw exercises. Exercises for breath control. Relaxation. Finger Painting, Writing and Drawing, Mental Hygiene. 25 Minutes daily.	Auditory stimulation. Tongue, lip-jaw exercises. Exercises for breath control. Relaxation. Finger Painting, Writing and Drawing, Mental Hygiene. 25 Minutes daily.	Auditory stimulation. Tongue, lip-jaw exercises. Exercises for breath control. Relaxation. Finger Painting, Writing and Drawing, Mental Hygiene. 25 Minutes daily.	Auditory stimulation. Tongue, lip-jaw exercises. Exercises for breath control. Relaxation. Finger Painting, Writing and Drawing, Mental Hygiene. 25 Minutes daily.
Speech Results.....	Some Monotony persists. Breath control fair to good. All sounds O. K. except l and s.	Breath control improved. Blurred, weak voice.	Breath control good. "s" occasionally slushy.	Breath control good. Voice loud (not unpleasant), Sounds good.
	Good Improvement.	Good Improvement.	Very Good Improvement.	Very Good Improvement.

Conclusions

In the study of these four cases, we find that differentiations of importance came in the ages of talking, history of eyedness and laterality, in the psychological findings of G2 and in the speech results. From the foregoing evidence it seems to the writer that two conclusions may be drawn: (1) Intelligence as low as that represented by I. Q. 70 is not necessarily a factor which hinders the correction of dysarthria. (2) A stability of sidedness, indicating the possibility of a better established dominant gradient of excitation sufficient to integrate the muscles operating for speech, is a factor which assists in the correction of dysarthria, and a lack of that stability is a factor which hinders the correction.

Rotary Sunshine Camp

Eva Mae Goosline

The inception of Rotary Sunshine Camp came about in the summer of 1922, one year after the first class for handicapped children was organized in the Rochester public school system.

At that time approximately twenty-five children were enrolled, representing various age levels and degrees of handicaps. Some of these children were able to cover several years of schooling in one year, while others had no previous instruction.

The first summer vacation found these boys and girls not only cut off from further school activity but from physical activity and play as well. The Board of Education with a broad, intelligent understanding, decided to continue the class throughout the summer months. Fully cognizant of the fact that this was not the ideal situation, it represented the best available solution at that time.

During the Fall of 1922 the Rotary Club became actively interested in the welfare of handicapped children. Realizing our need, they set about in their usual efficient manner to find a place whereby this group (now steadily increasing in number), might be adequately trained and cared for. As a result of their efforts the old Johnson Manor on Lake Ontario was leased from the City. The house, a large, rambling one, was badly in need of repairs. Plans to rehabilitate it were discussed with the usual Rotary enthusiasm, and resulted in Rotary members dividing into squads of various kinds—cleaning, carpentry, plumbing and painting being most important. They labored cheerfully and indefatigably until a transformed and modern structure awaited our second summer vacation.

A staff was now assembled, composed of director, teachers, counsellors, nurse, physical therapist, housekeeper and cooks. Various members of Rotary undertook the transportation of the children from their homes to the camp each Monday morning and returning them to their homes on Saturday noon, which was deemed necessary because of the variety of religious groups represented.

No. 5 School, Rochester, New York.

The Board of Education assisted materially until the need of retrenchment made it imperative that all support be withdrawn. The Rotary Club was then confronted with the necessity of either assuming the full burden of financial responsibility or of closing the camp. When put to a vote the decision was unanimous to "Carry On." About seventy members of Rotary were formed into committees—each committee having a specific responsibility, such as purchasing of food and supplies, transportation, entertainment, care of buildings and grounds, budgeting, auditing, planning for public inspection day and "Know Your Camp Day."

Each year the committees and staff meet previous to the opening of camp and discuss plans and policies for the coming season. At this meeting the committee chairmen report on their plans or any changes which they have considered. The director presents staff members and discusses any innovations which she and her staff think advisable for the improvement of camp routine.

The staff numbers sixteen in all, and includes a cook and her assistant, a housekeeper, a medical student who also acts as boys' counsellor and health adviser, a camp counsellor for boys and girls, a teacher of the orthopedic department who has been in close touch with children during the school year, and a physical therapy technician who carries on the treatment prescribed by the orthopedic surgeon in charge of the case.

The campers for the most part are chosen from the one hundred and thirty-five children in the orthopedic department of public school No. 5, the selection being made on the basis of nutrition, environment and need of treatment.

The physical therapy treatment is given out of doors, cots and blankets being placed on the lawn under trees

for use at all times of day. The technician then selects her patient and works on this child as long as she deems necessary.

The camp house affords plenty of hot water and a large bath tub, thus when advised, a hot water treatment is available (as in some cases of arthritis). A child with osteomyelitis may spend the morning on a cot under a tree or on a blanket listening to a thrilling story read by one of the counsellors if he so desires.

A system of recognition for a child's efforts toward self-improvement has been found very gratifying. A spastic must try to improve his walking, his handicraft, swimming or ability to dress himself. A large poster indicates individual progress. Weights are taken each Monday morning and any marked loss in weight means more rest for the coming week.

During the two hours on the beach in the afternoon the physical therapy worker gives posture exercises to groups of four or five children lying on blankets. What fun it is on the beach! It is so much easier to make prints of heels in sand than to walk on a floor or on the lawn. If an obstetrical arm is straightened, it can make a form in the sand which can be seen and enjoyed by the child.

When the swimming period comes, the instructors encourage use of handicapped arms and legs, teach floating and relaxation in the water. Fear, which is so marked in many cases of spastic paralysis, is lessened by swimming instruction. Such a child is placed in a sitting position in the shallow water to play, but in a few days he crawls farther out to be with his mates. Cases of poliomyelitis are encouraged to walk out in the water.

The program of the Rotary Sunshine Camp also includes games, music, story telling, dramatics, leather making, copper work and other forms of handicraft, while the camp grounds and environs are ideal for the study of nature. Scouting for both boys and girls is carried on, and moving pictures, roasts, outdoor suppers, campfires on the beach, as well as many other forms of entertainment make life most worth while and joyous.

The sympathetic understanding and unfailing interest of every Rotarian makes these things possible for the handicapped children of Rochester. During February for the past four years Rotary has sponsored a play for the benefit of Sunshine Camp. This has had the generous support of the loyal citizens of Rochester. In appreciation of this response, Rotary and the camp director have set aside one day during camp season known as public inspection day, at which time the public is invited and urged to visit the camp and observe the children at their work and play.

Sunshine Camp started with only one building, six acres of ground and twenty-five children. It now consists of a main administration building, and three other units, used for dormitories and recreation purposes, and represents a total outlay of $40,000. For the past five years sixty-five children have been cared for each week of the season, and during Spring and Fall seasons the camp with its facilities is turned over to the Friendship Nursery Center for use as a day school for under-privileged children.

HYDROLOGY AND CLIMATOLOGY. Mineral waters have always enjoyed an immense popularity in France. The multitude benefited by their action makes their reputation and characterizes their usefulness. In France their use goes back to the Gallo-Roman period. Stations were numerous, and all were proud to have their patents of nobility signed by some proconsul or even by an emperor. The celebrated map of *Peutinger,* of Vienna, points out the itinerary that one should take to traverse Europe, and France in particular, in the search of such and such celebrated waters.

Vichy, Plombières, all the *"Bourbonne"* waters, *"Bourboule," Ax, Ais Dax* (Agua), *Aigues,* etc., are of Roman origin, but this magnificent development was shackled and broken up by the invasions of the Vandals, the Saracens and the Goths, so that it did not flourish again until after the spacious times of Charlemagne. In the monastic period, when Benedictines, Celestins, Cordeliers, all *défricheurs* and builders, added baths to their monasteries, which were often erected near warm springs.—*FRENCH MEDICINE, by M. Laignel-Lavastine and M. Raymond Molinery.*

Conservative Treatment of Low Back Pain

Ernest E. Myers, M. D.

Conservative treatment of low back pain and its companion, sciatica, is a subject broad enough to include everything from Doan's Kidney Pills to the latest methods of the chiropractors and osteopaths. However, in order to be conservative the four methods that have been most successful in our hands will be presented.

Conservative treatment fails frequently, not primarily because the treatment used is worthless, but because it is wrongly chosen for the individual case, and this usually happens because the problem has not been given extensive study before the treatment has been decided upon. Therefore we shall presume in this discussion that a careful history has been taken, one which goes into the nature and location of the pain, mechanism of injury, question of antecedent attacks, visceral disturbances, focal infection, and so forth, so that it is possible to determine whether the pain is referred or local, and, if of the latter kind, what is the local part involved—skeletal or soft tissue. Moreover, a comprehensive physical examination, general and local, is absolutely necessary to keep error at a minimum. It is of little value to the patient to have a prolonged course of diathermy, massage, and exercise only to find after many weeks of no relief that the underlying cause of the trouble was prostatic infection, a pelvic disorder, or anomaly of the spine—such as a well-marked spondylolisthesis.

Despite their careful analysis, many cases still have to be treated somewhat empirically, so that before choosing more radical operative procedures, it is well to exhaust the following conservative measures.

We all like to hear about the latest things; so let us first consider the fasciotomy of Ober. It is on the borderline of conservative measures but is a very simple thing to do, and in the well-chosen case may give gratifying and even dramatic relief.

Dr. Frank Ober first reported this method of treatment in May 1935, and again in January 1936. He had observed that some cases of low-back pain, frequently with sciatica, exhibited contraction of the ilio-tibial band and fascia lata on the affected side. Occasionally the contraction was bilateral. It was thought that release of this fascial pull might alleviate the symptoms. Foundation for this theory lay in the observation that patients operated upon for sacroiliac fusion obtained relief of their sciatic pain very quickly, much sooner than the occurrence of any actual fusion. Also, some twelve to fourteen years ago Percy Roberts had a patient who became free of sciatic pain after a Smith-Peterson incision for exploration of pathology in the ilium. He did this procedure on sixteen other patients with relief from sciatica in all but one. Heyman in 1934 reported relief of several patients by stripping off the fascial attachments to the posterior superior spine.

When there is a shortening of the iliotibial band and its fascial expansion, there is an abduction contracture of the hip which Doctor Ober feels causes a severe strain, from a leverage action, on the sacroiliac and lumbo-sacral joints. He also points out that such fascial contraction may exert through the gluteus maximus and pyriformis a muscular pressure on the sciatic nerve. If one holds to Frieberg's theory of a sciatica due to pyriformis muscle spasm irritating the sciatic nerve as it emerges from under it, the release of the tight fascia may be considered an act of depression.

Henry O. Kendall points out that the tightness is a contracture of the tensor fascia femoris and is a result rather than a cause of the disability. He does not doubt that cutting it will relieve symptoms, but not permanently. We shall allude to this supposition again.

Patients likely to be relieved by release of the contracted iliotibial band should have had their symptoms long enough to assure one that the contracture is organic and not spasmodic, though differentiation may be made under general anesthesia. In the case with organic contractions, the restriction should remain. They also show restricted S. L. R. and cannot sit forward and flex the spine to a right angle with the knees held straight. In most of them, Ely's sign is present. All must show persistent abduction in the Ober test. This is done in the side-lying position, with the well leg down and flexed against the abdomen in order to obliterate lumbar lordosis. The upper leg is flexed at a right angle at the knee and held lightly by the ankle. It is then abducted widely and the thigh extended to be in a straight line with the body, the opposite hand steadying the hip. The leg is kept in slight external rotation and allowed to drop toward the table. If the tissues are contracted, it will remain in some degree of abduction.

The operation is usually done under local anesthesia and the incision extends from just below the anterior superior spine obliquely down and toward the greater trochanter, ending one inch above and behind it. The fascia is incised posteriorly well over the anterior portion of the gluteus maximus and forward to include the two leaves of fascia enclosing the tensor fascia femoris. All intermuscular septa in the area are likewise divided. In the dramatic case, when the leg drops into adduction upon the gaping of the incised fascia, the patient may exclaim, "Doctor, there goes my pain!" Some of the early cases of Ober were very gratifying. One patient who had not been able to stand up for months long enough to shave, who had a sacralized transverse fifth lumbar process and only transitory relief from epidural injection, was able to shave standing within forty-eight hours after fascial section and to walk four miles three weeks after operation. In his more recent article, Ober states that relief of sciatica has occurred in a few instances at operation, but in most it begins five to ten days afterwards. The lame back clears up in from six weeks to six or eight months. He reports on forty-two patients; twenty-three were well, ten improved, and nine unrelieved.

Our experience certainly justifies the use of this procedure in the carefully chosen case. Its main value to us, however, lies in its being a simple means of quickly breaking a vicious circle—that of the contracture which helps to maintain poor body mechanics and the resultant poor posture allowing further contraction of the fascia.

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The reason for the contracture in the first place may be due, as Doctor Ober has found in some instances, to prolonged muscle spasm or a fascitis, or, as Kendall points out, an adaptive shortening from faulty mechanics; that is, the tilting of the pelvis and the internally rotated femur associated with the pronated foot which approximates origin and insertion of the tensor fascia femoris.

It is our belief that permanence of cure from Ober fasciotomy must rely upon correction of any underlying faulty body mechanics.

Another conservative measure that has come into varying degrees of popular favor is the epidural injection of Sicard, used in the low-back pain with sciatic radiation. Ghormley's report in 1933 did much to popularize this method. Fifty-two percent of eighty patients so treated were cured, and twenty-four percent partially relieved. Allegretti in 1935 reported its use in sixty-four cases with complete relief lasting one to eighteen months in ninety-two percent. This result also suggests this procedure as a means of quick relief of symptoms with an interval of freedom from symptoms sufficiently long for the patient to recover his normal attitude of posture.

The procedure is simple: A spinal puncture-needle is inserted into the sacral hiatus upward for a distance of two to three inches. Aspiration is attempted to be certain that an abnormally low dura mater has not been punctured. Twenty to forty cc. of one percent novocaine is injected. If the needle is properly placed, the solution goes in easily without undue pressure. Some transitory increase in symptoms, especially down the leg, may be experienced. Then, after about ten minutes, a hundred or more cc. of normal saline is injected. No ill effects are experienced, and relief is usually immediate if only transitory. A second and third injection every other day may prolong the freedom from symptoms. The explanation of relief of symptoms is that minute adhesions as a result of inflammatory reaction or hemorrhage around the nerve roots are broken down by the hydrostatic pressure. This method has one valuable practical point for diagnosis. It has been observed that excruciating and increasing pain is produced if there happens to be a lesion, such as cord tumor, or nucleus pulposis rupture giving pressure on nerve roots. In this instance the continued injection of saline causes increasing pressure upon the lower cord.

Manipulation, for a time popular in America, has been abused and then neglected, so that the chiropractor and osteopath have the opportunity to cure many cases of low back strain and do succeed. Baer in 1917 brought this method to national attention when he reported success without relapse in ninety-seven of one hundred patients. His manipulation of straight-leg-raising to well beyond ninety degrees under full ether anesthesia was rather widely practiced for a time, but fell into the discard, apparently because the physical therapy follow-up became inadequate. It must be carried out conscientiously by the doctor himself or in close co-operation with the physical therapist, otherwise the patient loses interest and is not encouraged to do his utmost. It does require a certain amount of fortitude to persist with full amplitude of active motion with the soreness induced by manipulation, and the patient needs definite encouragement and reassurance.

From my observation, therein lies the success of the English in the field of manipulation. It did not impress me that they were so much more adept than we, but that they do closely supervise and secure the co-operation of their patients in the days of tenderness following manipulation. It is undoubtedly the method of choice in England. Harry Platt, Timbrell Fisher, Mennell, Bankart, and Bristow are noted exponents of manipulation.

It has the appeal to reason if one assumes that the low-back injury is followed by hemorrhage, synovitis, and continued muscle spasm which allows restricting adhesions to develop between either the joints or the fascial planes of the muscles. In the literature it is debated pro and con whether subluxations of the lumbar articular facets or sacroiliac joints do occur, but practically the occasional red hot acute low-back with a marked sciatic scoliosis and limitation of straight-leg-raising is almost completely relieved by a judicious hyperextension or rotary maneuver—and without anesthesia. In such a case, motions immediately become almost normal, and three to four days of back strapping complete the cure. It must be that a subluxation has actually occurred, even though not shown by X-ray. We do know that the sacroiliac joints are true joints and capable of demonstrable movement, at least when influenced by the physiology of pregnancy. Mechanically they are so shaped and situated that rotary displacement seems relatively easy. It has been pointed out that the pattern of the strongest fibers of posterior sacroiliac ligaments is such that they are relaxed when the ilium is rotated backward on the sacrum.

Manipulation can do only two things: replace displaced articular surfaces, or break down adhesive obstructions to motion. Therefore, the restoration of normal protection to the joints of the low back by a sound musculature must depend upon intensive training of those muscles that have become weakened and contracted or stretched through weeks or months of peculiar abnormal attitudes assumed by sufferers from low-back pain. Many cases are directly the result of a habitual poor posture which causes undue strain. Or an attack may follow repeated minor traumata due to the attitude a person must take in his work; for example, a presser who uses one foot all day; or a truck driver who has to brake frequently while driving over rough ground.

A sudden injury may precipitate trouble in a back that has barely been able to carry on under its handicap of poor mechanics due either to poor posture or congenital anomalies. Such backs we speak of as having a lessened factor of safety, and it takes only small, repeated trauma or a moderate single injury to cause symptoms which are very stubborn to clear up. Where they show symptoms, these backs may well be said to be in a state of decompensation.

Such patients, if they have acute symptoms, benefit by a preliminary period of bed rest of from one to three weeks with daily heat, massage, and motion (within the limit of comfort) to promote relaxation and at the same time to prevent stiffening. Then a comprehensive course of postural exercises can be instituted with gratifying results. Until these patients have regained sufficient muscle tone to hold the correction in their body mechanics they should be assisted by a light body brace. We find the Goldthwaite type very satisfactory. It is simple and though corrective in action does not completely restrict trunk motion. Of course, in a simple moderately acute strain in a person with adequate musculature, a firm adhesive strapping for a week or two will suffice.

There are many cases even among the congenital anomalies that can be rehabilitated by carefully performed postural exercises. Even spondylolisthesis is at times amenable to this treatment and may well be considered one primarily of poor spinal mechanics. Fusion, we feel, can be reserved for the patient who does not respond to

conservative treatment. The danger of further slipping seems remote. The age at which symptoms frequently appear indicates that they come on with the onset of slump in posture of middle life. Out of a group of forty-five cases one-third did not complain of symptoms until they were forty or older.

As to the kind of exercises: The simplest are best. They must accomplish good mechanical correction of weight-bearing and develop a coordinated muscle balance. In our clinic the Goldthwaite exercises work very well, and even if patients do not progress beyond the lying exercises, definite improvement to complete cure is obtained. Mr. Kendall, director of physical therapy at the Children's Hospital School, Baltimore, has had conspicuous success with this type of treatment. He individualizes the program for each patient as much as possible, giving exercises to stretch contracted fascia as well as to improve muscle balance. He feels that poor posture with the pronated foot and internal rotation of femur causes constant strain on the external rotators with adaptive shortening of the tensor fascia femoris. In order to overcome this tendency, he gives mechanical correction by raising the entire shoe on the opposite side, throwing the well leg into adduction and also applying an inside wedge to the shoe on the side affected to correct pronation of this foot.

He is confident that tight low back muscles throw great strain on the sacroiliac region and therefore must be stretched. However, the hamstrings, usually accused of being tight, are, in his opinion, actually already stretched by the forward tilting pelvis. He not only protects them from further tension in his stretching of the low-back group but gives exercises to strengthen them. He seeks to establish balance in the muscles that hold the pelvis level by stretching the contracted muscles to restore flexibility and by strengthening the weak muscles by carefully localized exercises.

In conclusion, let us place emphasis on the fundamental importance of re-establishing muscle balance and flexibility. This is the ultimate aim in treatment. The other measures outlined merely assist in attaining this end. Of course, if they alone are relied on to cure patients, a certain number will re-establish their own compensation, but the happy ending will more frequently be accomplished if attention is given to restoration of good body mechanics.

Relation of Muscle Control to Body Alignment

Ellen Neall Duvall

In attempting to discuss the relation of muscle control to body alignment, one must first determine what is meant by the term "body alignment." The best definition available is that propounded by the White House Conference of several years ago. Briefly, they stated that the ideal alignment or posture of the human body is that in which every inter-related system of the body functions at its best. Surely no one will disagree with this. Secondly, we must determine what is the alignment which allows this optimum of function.

After some study of anatomy and muscle action, it is found that at least the muscular system functions best when the human body is balanced with the main body weights held one over the other. The chief weights involved are the pelvic girdle, the rib case and the skull, which are balanced by movements at the skeletal joints. It follows then that these joints should be evenly aligned in correct relationship to each other. If we follow the thrust of the body weight through the joints, we have the ankle, the knee, and the hip joints; here the weight thrust deviates inward at an angle to the sacro iliac joints and then on upward through the intervertebral joints to the skull. As mentioned before, movement at these joints brings about balance or lack of balance of the human body. And movement is produced by the muscular system controlled by the nervous system. The muscular system functions best when there is no undue strain upon it. In other words, if the body weights in action or at rest are not well balanced, certain muscle groups are overworked to keep the human structure from tumbling over.

In considering the question of muscle control, we must remember that in order to maintain the ideal balance of body weights we presuppose good muscle tone which physiology tells us is achieved by muscle action. If, however, muscle groups are fatigued through unbalanced activity, this "good tone" is lacking. How are we to achieve this proper state of tone in muscle groups? Stretching and exercise will be of great value but will not be entirely sufficient. Extensive study in the fields of neurology and physiology have taught us the reactions of tight or tense muscles to stretching, and the reactions of over-fatigued muscles to exercise. Before a tight muscle is stretched it must first be taught to let go or relax. And before a fatigued muscle is exercised it must first be rested or relaxed.

We have now struck the problem of major importance in present day civilization,—that of excessive tension. We try to put into our day's work-and-play three to four times as much activity as the human system is capable of handling. The result is an excess amount of residual tension in muscle groups, even when at rest. And the concrete result may be seen in the many mental institutions today. Many individuals have talked and written of the speed with which we live and its destructive influence upon the human body. Although we grant this point, we must admit that the fight for economic security leaves us very little choice in the matter. So we are forced to look for a means of combating this speed other than slowing up our rate of living. One such means is relaxation and learning to use our bodies efficiently with the least amount of effort. Specifically, as far as our present problem is concerned, this means controlling our muscles so that only those groups needed

1. Miss Rathbone published her monograph "Residual Neuromuscular Hypertension: Implications for Education," September 1936.

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for a designated action are used and when not needed they rest or relax. This, of course, is not easily accomplished.

We are accustomed to recognizing two types of muscles, the voluntary and involuntary groups. Theoretically we can will or control the actions of the voluntary group. But the larger proportions of our daily activities have been trained and relegated to the subconscious, and nerve paths controlling the muscles have been built up to the point where conscious control has been lost. Hence habits are formed; but due to the speed of living many of these habits have, so to speak, gotten beyond themselves, and the muscular and nervous systems are doing more work than is necessary.

A simple illustration will perhaps serve to strengthen my point. Take the habitual standing position of a person with poor posture. The subject is not conscious of using leg and trunk muscles to maintain the upright position, although voluntary muscles are used. The outstanding defects of the case are, we shall say, hyperextended knees, protruding abdomen, and lordosis. Certain leg muscles are too tight while the antagonists are stretched; they are overworking in an effort to keep the person upright. The lower back muscles are tight and the antagonistic abdominal group are stretched. The back muscles have a tremendous amount of residual tension,—more than is needed to balance the body. As a result these muscles are overworked and strained, and the physiological rhythm of work and rest is poorly balanced. Does this make clear the inefficient use of muscles involved? Means of approaching this problem of hypertension will be briefly treated farther on in this paper.

Before going further, mention should be made of another factor in producing good body alignment which will not need to be enlarged upon to any great extent; namely, general health as a determining factor to good muscle tone. We are born with a biological structure inherited from our forebears. We are weak and puny, subject to certain diseases and illnesses, or strong and husky, depending upon the type of ancestors chance has given us. We have had no control over this to date. Given this inherited structure, environment molds it. Within reason, we have a certain amount of control over the environment, depending upon the economic strata into which we have been born. Specifically, this control includes proper food and rest, proper clothing, lighting, sleeping and seating arrangements and proper attention to illnesses. Given the ideal environment, the weak and puny subject has a good chance of developing physically and achieving good physical health. Good muscle tone is part of the end result. Obviously the husky individual also profits by such an environment. Therefore, the first concern of the person endeavoring to produce good body alignment is to set up an environment approaching the ideal.

We shall now face the problem of controlling body alignment apart from the environment. Let us assume that you accept the statement that we must first teach the body to relax. It would be hitching the cart to the horse if we first strengthened muscles and then tried to teach them to rest. Too many muscle groups are already fatigued from unnecessary overactivity. The first step is to develop, where possible, conscious control of these groups.

Dr. Edmund Jacobson of the University of Chicago proceeds on the theory that an individual must first have the kinesthetic sense of a certain muscle in action and then must acquire the kinesthetic sense of the same muscle at rest. For example, the subject's arm is resting on a support, palm up; the subject is told to flex the elbow and tell where he feels the muscle working; he then is told to let the arm go; he may have to do this several times before he lets the arm go completely and has accurately located the muscle or muscles involved. This is a long process and is too technical to use with students.

Miss Lulu Sweigard, working at New York University, and Miss Josephine Rathbone at Teachers' College, Columbia, have also been working in this field in recent years. Unfortunately neither of them have any published work on the subject.[1] However, Miss Sweigard contends that not only must one learn to relax the large voluntary muscle groups but also the small, deep muscles, particularly those of the torso, since these are used in maintaining held positions more than we realize. These muscles, although they belong to the voluntary group are not consciously controlled. Hence some means must be devised of reaching them. She has used the means of ideas or concepts; thinking through an idea which will reach designated muscle groups. For example, in working on general body relaxation, the subject is placed in a position whereby all muscles of the body are released, as much as possible, from tension. In this position the subject is on his back, knees bent to relax the quadriceps and abdominal groups, and the arms either relaxed at the side or crossed loosely on the chest. Then the subject is asked to visualize the body as a loose bag of some granular substance on which gravity acts to pull to the lowest possible level. Conscious effort to press the body into the table or bed is discouraged since this means tension of certain muscles to produce such an action. Keen observation on the part of the instructor may note tense position of hands, arms, throat, etc., and by centering attention on these, one may gradually induce relaxation. Several sessions may be necessary before any degree of success is achieved.

This past year we have been working, among other things, on relaxation,—following, where possible, Miss Sweigard's work. The work is decidedly interesting and encouraging. Students have been sent to our department by the medical office for extreme fatigue, over-mental stimulation, inability to sleep, etc. After a discussion with them concerning their routine work they have been urged to find five to ten minutes twice a day, preferably during the most crowded hours, when they could assume this position and consciously go about trying to relax. They have continued to come once or twice a week for a check-up on particularly tense muscles. These students have reported an improved sense of well-being.

In the general body mechanics classes, in addition to exercises designed to balance muscle groups, this idea of relaxation and the need for such knowledge to offset the demands of daily activities has been presented. Here isolated cases have said that they had been told many times they must slow up and relax, but they never knew how. They seemed quite pleased with the results.

In individual corrective work with posture cases, one is invariably faced with the type known to all,—the thin, aesthenic type with a tremendous amount of nervous energy. The posture is usually poor and as a rule, such a student is below par physically. They complain of fatigue but can never find time to rest. In previous years, aside from putting as much rest in their program as possible, an attempt was made to balance their muscles. The work was slow and the results not encouraging. This year we tried, first of all, to teach them to relax, at the same time giving them just enough general exercise to stimulate circulation. After two or

three weeks of this regime, exercises were added to balance specific muscle groups. In most cases progress was better than in previous years. Particularly did the tight muscle groups show improvement.

This work is decidedly in the experimental stage, since we have worked with the relaxation idea for only a short time and have no statistics to back our statements. However, the results shown this year do warrant further trial and study. Credit for the work goes to those who have been making a thorough and scientific study in the field. Namely, these people are Dr. Jacobson, Miss Rathbone and Miss Sweigard.

SUMMARY

In achieving a balanced body alignment, proper muscle control must be developed. This involves, first of all, good general health with its many contributing factors. Next, efficient use of the body must be worked for, and by this is meant training of the specific muscle groups to do their particular job and no more. Furthermore, an integral part of this training is the knowledge of muscle relaxation.

Third World Conference for the Case of Cripples 1936, Budapest, Hungary

Paul H. King

. . . We meet to consider, in the light of past experience, the problems of the present, and to outline a program of future endeavor. The movement proceeds in logical order; first, we demonstrate conclusively the entire feasibility of international conference; second, we determine clearly the manner of general approach; and third, we present a plan of action.

Nature and Extent of Problem: Before formulating a plan, we must, of course, give thought to the nature and extent of the work to be done. This naturally involves some estimate, however crude, of the scope of the entire problem, and some appraisal, however inadequate, of the progress thus far made.

No one, so far as I am advised, has ever had the temerity even to estimate the number of crippled children in the world, to say nothing of crippled adults.

In the United States, through a number of diversified surveys, an average ratio of three crippled children per one thousand of population has been worked out. In some of the less favored localities the ratio has risen as high as six. . . .

If, however, we accept an estimated world population of two billion and apply this well known ratio of three per one thousand, we evolve the stupendous figure of six million crippled children alone. The startling result is at least a challenge to the civilized world to accept or disprove. This involves the very first step of the plan of action—an adequate census of the crippled in every country in the world. If this Congress accomplished nothing more, this, in itself, would be a great achievement.

Progress in Organization Work: Now, as to the progress thus far made. Let us premise this consideration with the thought that the organized movement for crippled is of yet comparatively short duration. It seems strange that the world has been so long in coming to a realization and an appreciation of the problem of the cripple. In ancient times he was destroyed as unfit to live, later tolerated and endured as a beggar, or, if more favored, as a Court Fool; and finally, in this more modern day, in many countries, discovered, treated, cared for, educated, trained, and placed in useful employment. A brief survey shows most encouraging progress in organizing for the work. In the United States, societies for crippled children have been formed by the International Society in thirty-seven of the forty-eight states, and one in the district of Columbia, and, as you will later learn, legislation in various forms has been enacted, designed in different ways to meet and remedy the conditions.

In Canada, four of the nine provinces have organizations—Ontario and Quebec flourishing societies, and New Brunswick and Nova Scotia the framework of future active groups; British Columbia is part of our so-called Pacific North West Territory.

Efforts are being made in both the United States and Canada to perfect organizations in all states and provinces.

In Mexico, the Association of Friends of the Crippled Children has just been formed, and its distinguished president, Dr. Farill, is in attendance at this Congress. Plans are being developed for the extension of the movement into Central America, the West Indies and South America.

In the Eastern Hemisphere the general movement is gaining headway. In Europe there are ten societies with others in immediate prospect. . . . Organized effort in Africa and Asia has not yet been made, but preliminary visits to South Africa by Paul P. Harris of Rotary International, and to the Orient by the Rev. Fr. Joseph C. Beaudun of the Quebec Society for Crippled Children, indicate great possibilities. Through the influence of Rotary International, the organization of the New Zealand Society for Crippled Children, with branches throughout the Dominion, has just been consummated. In Australia, The New South Wales, The Newcastle and District Association, and the Queensland Societies for Crippled Children have been in active operation for several years.

Emphasis is placed on the matter of organization for the reason that it is through organized work that we may bring to the people of the several countries generally a realization of the problem, and an appreciation of the necessity of taking effective action toward the solution.

President, International Society for Crippled Children, U. S. A.

Then may appropriate legislation be urged and adopted; then may hospitals, schools, and work-shops be established; and then and only then, may additional facilities be established. Forty centuries of unorganized effort look down upon us. A great awakening is taking place in many parts of the world, thanks to such leaders and workers as are here present, but at least two, if not three continents lie practically dormant; in Asia, scarcely any orthopedic surgery, with amputation almost the sole remedy, and with the crippled still beggars in the streets; in Southern Africa, fine institutions to lighten the darkness of inaction; and in South America, evidences of hope, such as the presence here of such outstanding leaders as the delegates from Chili. It is our devout hope that these "ambassadors" may take back to their land, and to the other countries in South America, an inspiration which will mean new life and new opportunities for the crippled children of their continent.

Developments in Field of Substantive Work: As to developments in the substantive work for the crippled, I shall not anticipate the deliberations of this Congress. You are here to tell the world of your progress, of scientific achievements in surgery and the therapies, on nursing and convalescent care, in education and vocational training and placement, and in prevention; and you will here record it for dissemination throughout the globe. . . .

The Work to Be Done:

I. *Organization:*

1. Complete the organization of societies
   (a) In the United States and Canada.
   (b) In Europe.
2. Strengthen existing organizations where necessary.
3. Organize societies in
   (a) Central America and the West Indies.
   (b) South America.
   (c) Asia.
   (d) Africa.

II. *Educational Publicity:*

1. Develop the magazine of the International Society, "The Crippled Child," into a publication more international in character.
2. Work out educational publicity material of general character suited to the needs of the several countries.
3. Adopt standard terms, so that all countries will, in their discussions, be talking about the same things.
4. Agree upon standard forms of statistical information for use in reporting, comparing and disseminating data of mutual interest.
5. Prepare bulletins on the laws and systems of the several countries.
6. Furnish, to any countries desiring such, suggested outlines of procedure.

III. *Legislation:*

1. Perfect existing laws in the several states, provinces and countries.
2. Secure the enactment of remedial and preventive legislation where none now exists.
3. Immediately obtain laws in all countries, whether having legislation or not, providing for an enumeration or census of crippled children and crippled adults, together with incidental data, unless such a census has recently been made.

IV. *Establish a clearly defined system,* unless one already exists, in each state, province or country, suited to its own particular conditions and needs. This will be by

1. Legislative enactment providing an orderly scheme of plan, and
2. Programs of voluntary societies promoting, supplementing and reenforcing governmental action, and coordinating the work of all private agencies to this end.

V. *Carry out the substantive program,* as needed, for the crippled child and the crippled adult through

1. Enumeration and discovery.
2. Clinical diagnosis.
3. Hospitalization and treatment, including convalescent care.
4. General academic education.
5. Vocational training.
6. Vocational placement.
7. Prevention.

Conclusion: Does the task look difficult? Does the way seem hard? Does the goal seem remote?

NOT SO: We have the brains, the ability, and the courage to overcome all difficulties, to surmount all obstacles, to reach the goal: *"Care, treatment, education, training, and placement for every cripple, and the prevention of crippling conditions."*

The problem of the crippled child is a constant appeal to our hearts, a thrilling challenge to the minds, and a tremendous opportunity for the work of our hands. Let us, in greater measure than ever before, respond with sympathy to the appeal, meet the challenge with ability, courage and determination. Past achievements give confidence, present demands require action, future possibilities thrill with inspiration.

FORWARD THROUGHOUT THE WORLD!

An Attribute One Cannot Estimate.—Devotion is an attribute one cannot estimate and record by ordinary standards. How much the practicing doctor cares about his patients as individuals apart from their being the source of his livelihood; how much the medical scientist may be interested in promoting science rather than in securing his own promotion; how much the teacher influences his pupils to their best efforts, unmindful of what the curriculum briefly requires of him; how much the student engages in his work for the work's sake, regardless of his marks and rating—all these things depend on a devotion which places spiritual above material rewards. —Cushing, Harvey: Consecratio Medici and Other Papers, Boston, Little, Brown & Co., 1928.

Treatment of Carbuncle with Short Wave Diathermy and Cautery Puncture

Morris Fellman, M. D.

The fact that striking symptomatic relief occurred, the clinical course shortened and apparent systemic complication avoided has prompted this report on the use of short wave diathermy and cautery puncture in the treatment of three cases of carbuncle of the neck. In two of the cases, despite the actual inflammatory lesion, pain was the chief complaint and the reason for admission and its relief within thirty minutes after the application of the high frequency therapy without the use of sedatives is worth remarking.

Although some investigators have claimed certain specific biologic or bactericidal actions for short wave, its thermal properties only were the basis for use in these cases. The frequently mentioned contraindication in acute non-draining infection was also kept in mind and to meet this condition the use of cautery puncture to convert the non-draining into an externally draining cavity was adopted. In addition, the cautery was selected so that all vascular supply would be sealed off and the possibility of open blood spaces that might occur with incisions was eliminated. It is known that high frequency currents avoid mechanical and chemical effects but have the ability to heat body tissues through which they pass. Physiologically this results in the opening of large numbers of capillaries and the increase in the rate of the blood flow through the capillaries. The acceleration of tissue metabolism is procured and there is an augmentation of the rate of exchange between blood and tissue.

The three cases presented lesions of the type that could have been treated in one of the three following ways; (1) excision by either scalpel or electrosurgery under general anesthesia; (2) cautery puncture under general anesthesia followed by hypertonic wet dressings or the application of heat; (3) the use of bacteriophage, particularly if a bacterial strain of Staphylococcus aureus or albus is present. All the carbuncles had the usual brawny consistency studded throughout with numerous pin-point spots exuding pus, but with no definite fluctuant areas.

The technic of the treatment is as follows. A cable is attached to the short wave machine and is given three turns at the center so as to form a circle, large enough to extend beyond the margins of the lesion. Several thicknesses of toweling are placed over this and the patient is instructed to lie down in such a manner that the carbuncle occupies the center of it. The current is turned to the point of comfortable heat tolerance and the treatment is kept up for fifteen or twenty minutes either once or twice in twenty-four hours.

The carbuncle is carefully inspected each day and as soon as any point of fluctuation is seen this is drained by puncturing with the actual cautery. No anesthesia is required as the tissues at this spot are usually so insensitive or desensitized that the patient scarcely perceives the cautery thrust. The fact that anesthesia is not necessary is important because carbuncles usually occur in old persons, frequently debilitated, and often diabetic in whom the use of an anesthetic presents a definite hazard.

The clinical courses of the cases forming the basis for this report are as follows:

Case I. J. T., aged fifty-six years. One week before admission he noticed a pimple on the back of his neck which he scratched and within twenty-four hours a physician considered it advisable to incise. Notwithstanding this treatment the condition became worse so that upon admission to the hospital he presented a hard, indurated area on the back of his neck about 4 inches in diameter. There was bluish discoloration about the margins and a yellow area in the center, still firm but showing numerous small pus-draining points. The pain was very severe. A twenty-minute short wave diathermy treatment was given and in a half-hour he was very comfortable. The next day the center was fluctuant and this was drained by several cautery punctures without anesthesia. The diathermy was continued daily and as additional areas of fluctuation appeared they were punctured. The patient was discharged in thirteen days with the infection entirely cleared and only a faint pink blush to mark its site.

Case II. J. F., aged sixty-three years, complained of a painful infected swelling on the back of the neck for one week continuously increasing in size. There were a few superficial yellow areas which were points of pus ready to discharge spontaneously. The entire part was hard and indurated and measured about 3 inches in diameter. One of the small pus pockets was punctured and the cultures showed Staphylococcus aureus. A short wave diathermy treatment was given at once and repeated the next day. In thirty-six hours the center area was ready for cautery puncture. This was repeated when indicated and the patient was discharged in twelve days with the infection cleared. The relief of pain soon after the first treatment was mentioned by this patient.

Case III. I. N., sixty years of age, complained of an abscess on the right side of the neck about 4 cm. in diameter for the week previous to admission. He gave a history of diabetes for eight years with irregular periods of proper supervision. When admitted he showed a moderate amount of glycosuria which at the start required ten units of insulin three times daily, gradually diminishing. Thirty-six hours after the short wave diathermy, this lesion ruptured spontaneously and did not require cautery puncture. He was discharged in one

Attending Surgeon, Jersey City Medical Center, Jersey City, N. J.
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week. There was slight redness and induration but no fluctuation or pus exudate and the reason he left the hospital was because he said that he didn't feel "sick enough to stay any longer."

SUMMARY

In the discussion of these cases the ease of application of short wave diathermy as compared with the previous conventional lower frequency diathermy is noteworthy. In addition, another advantage is the comparative comfort with which persons of this age may be treated. This plan of therapy is, therefore, considered a valuable adjunct to management of cases of this type.

New Model Fracture Clinic at the Miller General Hospital in London

Jessie Shaw Coman

It is evident that more and more attention is being given to health in industry in England. To show the increased awareness for this need, it is interesting to see the plans of a new clinic at the Miller General Hospital shortly to be opened. This hospital in Thames side South East London is in a dense industrial area. As fractures occur mostly among the industrial classes, the new unit is particularly well situated.

The hospital has had a fracture clinic for some time, but in this new building there is an entire floor especially equipped for the treatment of fractures. Prevention of deformities and permanent disabilities, with muscle re-education to hasten recovery and restore patients to full time working ability, is stressed.

To differentiate the work done here from that of the old clinic, attention is called to the fact that heretofore fracture cases have been treated with general surgical cases and have had little special attention. This new unit provides a specially trained staff and equipment, such as X-ray, etc., to be used solely for fracture cases.

Specialization means extra expense involved by special training and the provision of special equipment. This has been made possible by a gift of £5,000 through the Industrial Welfare Society. Mr. Edwin C. Lindsay, well known orthopedic surgeon, is at the head of the clinic.

The unit is to have its own waiting room, operating theater, plaster room, surgeon's room, record room and a large gymnasium with apparatus and cubicles for massage and electric treatments.

New cases of suspected fracture will be sent direct to the new unit for X-ray and follow-up care.

Regular consultation clinics will be held for all cases and physical therapy will follow as prescribed.

A record of each case will be kept in an up to date record filing system, showing the progress each patient makes under this specialized treatment. This will also demonstrate the value of the service, which will benefit employer as well as employee and is important from the standpoint of National Insurance.

15 Manchester Square, London—W1, England.

(Editor's Note: Miss Coman is a former member of the orthopedic staff of the Visiting Nurse Association of Chicago and is a member of the American Physiotherapy Association.)

The patient has no more right to all the truth than he has to all the medicine in your saddle-bag. He should get only so much as is good for him.—Oliver Wendell Holmes.

The Physiotherapy Review

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Scientific Exhibit

The American Physiotherapy Association will have an exhibit in Booth 619 in the Scientific Exhibits section of the American Medical Association Convention in Atlantic City June 7-11 which promises to be of unusual interest. The subject is "Improvised Home Apparatus in the After-Care of Poliomyelitis," and it is being planned and prepared with the help of the physical therapy nurses in the Visiting Nurse Association of Chicago.

A part of the exhibit is a miniature model of two rooms—a bedrom and a kitchen—in a home of low income. The bedroom contains the bed with firm hard surface and a portable adjustable cart for daytime use. The galvanized tin tank placed on wooden saw horses is set up in the kitchen, and the kitchen table is in readiness for the massage and table exercises. Splints and various devices to keep the patient in a position of physiological rest at all times are shown. A small doll is used as the patient and larger dolls represent the mother and the public health nurse physical therapist who is instructing her in the care.

Wall space in the booth shows posters with enlarged photographs of other types of improvised home apparatus which can be made inexpensively. Larger models of arm, leg, hand, and neck splints and home-made corsets will also be shown.

The making of wire splints will also be demonstrated in the booth.

A moving picture film, prepared by Dr. Walter P. Blount and Miss Mildred Elson will demonstrate essential details in the care of poliomyelitis patients.

The story of the preparation of the miniature model part of the exhibit is a human interest story in itself.

The bed was constructed by a young man who is just beginning to walk with braces after being in bed four years with paralysis of both legs, following a fractured spine. The tank and the portable cart were made by the father of a poliomyelitis patient who had made similar apparatus for his own child. The father of one of the nurses made the saw horses on which the tank rests. The mother of another pieced a quilt for the bed.

A real sacrifice was made by a ten-year-old girl who has been in bed for several months following an attack of poliomyelitis. Her greatest treasure is a dollhouse completely equipped which had been passed on to her by the daughter of one of the directors of the Visiting Nurse Association. The nurse who gives home treatments to this child told her about the exhibit and showed her the doll which she had dressed to represent the mother. Suzanne was captivated by the idea of the exhibit and wanted to contribute something herself. She gave the miniature radio which belonged to her much prized doll house and added, "Well, I've done my bit for the Physiotherapy Association."

The pictures for the posters were taken and enlarged by the brother-in-law of one of the nurses whose hobby is photography.

Announcement

In accordance with the policy of the Mayo Clinic to extend its educational facilities to as many students as possible, plans have been made to establish a course in physical therapy technic for graduate nurses, or graduates of approved schools of physical education, who have completed a physical therapy technical course in a school approved by the American Medical Association. A limited number of students will be offered a six months' course and each student will be paid a maintenance stipend of $50 a month during this training period.

Special courses in physics, anatomy and other basic subjects will be available as well as advanced courses in fever nursing, hydrotherapy, electrotherapy, light therapy, massage and corrective exercise. The course will be a flexible one offering the outstanding physical therapy technical graduate an opportunity for more extensive work in branches of the subject which are of particular interest. Facilities for clinical research in certain phases of physical therapy will be provided.

The course will last for six months or multiples thereof, and students will be accepted after May 15, 1937. No degree or certificate will be granted with this course, it being our desire merely to extend the facilities of the Clinic to the student who wishes to develop himself along certain practical or research lines and is in need of a maintenance stipend during this period.—*Frank H. Krusen, M. D., Section on Physical Therapy, Mayo Clinic, Rochester, Minnesota.*

Sixteenth Annual Convention, June 27 to July 1, 1937

On to Minnesota!*

Saint Paul and Minnesota will be hosts to the national convention of the American Physiotherapy Association to be held June 27 to July 1. A most interesting program of exceptional educational value and entertainment has been arranged and is announced to you in this issue. Of particular interest and representative of Minnesota hospitality is a "smorgasbord" and Swedish entertainment planned for Sunday evening, offering a buffet supper in typical Swedish style. On Monday afternoon a clinic will be conducted for the delegates at the Gillette State Hospital for Crippled Children in Saint Paul. On Tuesday morning another clinic will be held at the University Hospital in Minneapolis, followed by a visit to the Shriners Hospital for Crippled Children and the Michael Dowling School for Crippled Children in that city, and luncheon at the Town and Country Club in Saint Paul. The convention banquet will be given Tuesday evening at the Hotel Lowry. Wednesday will be devoted to sessions at the hotel, for which some excellent papers and demonstrations of physical therapy technic have been prepared.

Delegates will go to Rochester, Minnesota, on Thursday, July 1, to attend a clinic to be given by Dr. F. H. Krusen of the Mayo Clinic.

We desire to take this opportunity to extend to all of you an invitation to make your trip to the convention also your vacation, and to plan to spend a few days or weeks among Minnesota's beautiful lakes following the close of your meeting. This is America's finest summer playground. Here are not only 11,007 clear, cool lakes, but almost an identical number of rushing streams. Here are the most picturesque drives and canoe trails in the world. Here is the world's foremost and largest wilderness state park, Itasca Park, and two immense national forest preserves, the Chippewa and Superior National Forests.

Minnesota summer days are long—daylight lingering in mid-summer to nine o'clock—and are pleasantly warm; while nights are refreshingly cool, insuring a good night's rest. There are few nights when blankets are not wanted.

For many years Minnesota has been the favorite vacation land for happy people from every state in the Union. Within its confines are the headwaters of three great American water systems, ending in Hudson's Bay far to the north, the Atlantic Ocean to the East, and the Gulf of Mexico, into which flows the mighty Mississippi, father of all waters, which has its source in the heart of Minnesota's beautiful wilderness state park—Itasca Park. Derived from the Latin word "veritas" (meaning true), and "caput" (head), Itasca—literally "true head"—is the name given by Schoolcraft to the crystal-clear springfed lake from which the Mississippi rises, when he traced the river to its ultimate source more than one hundred years ago.

*Cuts furnished through courtesy of Convention Department of the Saint Paul Association of Commerce.

This beautiful state park, comprising 25,209 acres, in addition to Lake Itasca, contains also many smaller lakes and numerous streams winding their way to the Mississippi. Thickly wooded, the area is a forest preserve for Minnesota's finest stand of pine. Wild animal and bird life is protected, and it is a common sight to see deer, beaver, porcupine, and countless varieties of game birds. Vacation accommodations inside the park include Douglas Lodge, one of Minnesota's finest resorts, built in rustic log cabin fashion with a huge main lodge and private sleeping cabins scattered among the pines; and a modern, well-equipped tourist camp offering cabins or a place to pitch your tent, as you may prefer. Just outside the park are several other attractive resorts.

In fact, all of Minnesota from the Dakota border to Lake Superior is a veritable succession of recreational and scenic delights. Whether you come in your own automobile, or by train, bus or airplane, you are limited in your choice only by the distance you wish to travel and the price you wish to pay.

If you seek the deep pines, or perhaps relief from hay fever, you will select any of the regions north of

Brainerd or Duluth. Replete with tall tales of Paul Bunyan, legendary Minnesota lumberjack of gigantic strength and size, the region north of Brainerd offers perhaps the greatest concentration of resorts and camps. The widest possible range of accommodations is available, from camping grounds possessing every possible convenience for tents and trailers, to fashionable resorts providing maid service and boasting cabarets and sporty eighteen-hole golf courses.

Superior National Forest in northeastern Minnesota, extending from Lake Superior 180 miles west along the Canadian Border, is one of the largest and best known national forests in the United States. It was established in 1909 and contains 2,900,000 acres, of which practically one-fifth is water surface. There are over 1,500 lakes in the forest, and streams and rivers are so numerous as to be almost uncountable. This is one of the nation's last wildernesses and the fisherman's paradise. Sporty trout lurk in these fast running streams and the deep cool lakes are habitats of the gamest bass and land-locked salmon eager to give battle to your rod and reel.

However, we do not want you to think that this region is so wild and unimproved as to be inaccessible. Although the area has been set aside to preserve its beautiful natural state, excellent roads have been built to make it possible for the motorist to see much of the forest without having to resort to the canoe trails and foot trails of the pioneers.

The Lake Superior International Highway on the outer edge of the forest, extending easterly along the north shore of Lake Superior from Duluth to Port Arthur, Canada, rivals in scenic grandeur the most famous sea-coast drives in the world. Two hundred miles long, the highway overlooks Lake Superior for more than half the distance. The deep blue of the lake on one side, the red granite cliffs on the other, broken by the cascades of turbulent rivers as they fall to Superior, the north shore drive is a sight you will never forget. Fine improved roads branch off into the forest, several of them bringing you out again at the northwestern side, and some ending at resorts and little settlements within the wilderness. The list of vacation accommodations along Lake Superior and in the forest is long and varied, and some of the most picturesque resorts in the state are located here.

We have attempted to describe briefly merely a few of the principal vacation regions in Minnesota, but there are few locations in the state which do not rightfully belong in this 10,000 lakes playgrounds. In any section your fancy may choose, you will find accommodations to suit your budget and to provide the kind of vacation you want.

Come to Saint Paul to enjoy with us the benefits and the fun of the 1937 convention—and bring along your bathing suit, your fishing rod, your golf clubs, your trailer, your tent, and be prepared for the best vacation you ever had.

Program

Sunday, June 27th:

2:00 P.M. Registration.

7:00 P.M. Pep Supper—A Real Swedish Smorgasbord. Plan for your Chapter representative to be on hand with a report of the past year's activities.

Monday, June 28th:

9:00 A.M. Address of Welcome.

9:15 A.M. Business meeting.

2:00 P.M. Clinic at Gillette State Hospital for Crippled Children. Speakers: Dr. C. C. Chatterton, Chief of Staff, and Dr. George A. Williamson.

8:00 P.M. Address: Mental Hygiene of the Handicapped Child—Dr. Bryng Bryngelson.

8:45 P.M. Address: Speech Training at Michael Dowling School—Mrs. Bernice Rutherford.

9:15 P.M. Address: The Organization of a Teaching Clinic for Physical Therapy—Mrs. Carolyn M. Brown.

Tuesday, June 29th:

9:00 A.M. Clinic at University of Minnesota Hospital—Speakers: Dr. Wallace H. Cole, Professor of Surgery and Director of Division of Orthopedic Surgery, University of Minnesota Medical School.

Address: Scoliosis, Dr. Arthur A. Stiendler, Professor of Orthopedic Surgery, University of Iowa Medical School.

12:00 M. Visit to Shriners Hospital for Crippled Children.

1:00 P.M. Luncheon—Tables for special groups are being arranged.

2:30 P.M. Visit to the new Physical Therapy Department of Michael Dowling School, Minneapolis.

4:00 P.M. Tea and Exhibits.

7:00 P.M. Banquet: Speaker—Dr. W. A. O'Brien of the University of Minnesota.

Wednesday, June 30th:

9:00 A.M. Business Meeting.

2:00 P.M. Address: Personality, Dr. Gordon R. Kamman.

3:00 P.M. Demonstration of massage technique of Cleft-lip and Cleft-palate—Speaker: Miss Pauline Plummer.

3:30 P.M. Address: The Rationale of Physical Therapy in the Treatment of Muscle Disorders—Speaker: Dr. Herman Chor, of the Department of Nervous and Mental Diseases, of Northwestern Medical School, and Miss Gertrude Beard.

Thursday, July 1st:

8:30 A.M. Leave St. Paul for Rochester, Minnesota.

11:00 A.M. Program—A day of interesting addresses and demonstrations, and a tour of the Clinic and various hospitals is being planned by Dr. Frank H. Krusen, Chief of Physical Therapy, Mayo Clinic.

Transportation

Word has been received from the various railroad companies that attractive rates to the convention will be in effect from all sections of the country. From Chicago you may choose a daytime trip through the lovely Wisconsin and Minnesota countryside on fast streamline trains. Do not fail to take advantage of this fine vacation opportunity. Consult your local railway representative for detailed information.

News

The Tri-State Hospital Assembly (Illinois, Wisconsin and Indiana) of the American Hospital Association was held May 5, 6 and 7, at the Hotel Sherman, Chicago, Illinois. The following program on physical therapy, arranged by the Chicago and Wisconsin Chapters of the American Physiotherapy Association, was given May 6, from 2 to 4 p. m.:

General Theme—Organization and Arrangement of the Physical Therapy Department with Regard to Efficiency, Economy, and the Budget.

Discussion from the point of view of:

The Head of the Physical Therapy Department—Dr. John S. Coulter, Northwestern Medical School, Chicago.

The Referring Physician—Dr. Phillip Lewin, Michael Reese Hospital, Chicago.

The Technician: The Physical Therapy Department with a Staff of Two—Ruby M. Tuft, Passavant Memorial Hospital, Chicago.

The Technician: The Physical Therapy Department with a Staff of Twelve—Marguerite Svebelius, Michael Reese Hospital, Chicago.

The Technician: The Physical Therapy Department with a Pool for Under Water Gymnastics—Margaret Campbell Winters, University of Chicago Clinics, Chicago.

The Council on Physical Therapy held its annual meeting January 8 and 9.

. . . There has been a change in the personnel of the Council in the past year. Drs. George M. MacKee and Robert B. Osgood have resigned. Dr. Osgood resigned because of other more pressing duties, and Dr. MacKee was obliged to curtail his activities. Dr. Frank R. Ober was appointed to fill the vacancy left by Dr. Osgood, Dr. George C. Andrews to fill the vacancy left by Dr. MacKee and Dr. Frank Dickson to take the place of Dr. Gaenslen. The personnel remains at twelve.

. . . Grants in aid of research are awarded to those persons who demonstrate that they have a problem of merit. Accomplishments of those receiving such grants were looked on with satisfaction. However, the Council felt that there may be more physicians and investigators working on physical therapy problems desiring aid, and it was believed that announcement should be made in scientific journals concerning the availability of these grants of limited sums.

. . . Much of the work of the Council the past year has been confined to the consideration of so-called short wave diathermy machines. In view of the deliberations, the Council believed it was justifiable to state, based on the present available evidence, the following conclusions:

1. There is no specific biologic action of high frequency currents.
2. There is no specific bactericidal action.
3. The therapeutic effect is due to the heat produced.

Elaborating on these three conclusions, the Council felt that the general practitioner should understand that when he buys a short wave diathermy machine he is simply purchasing an apparatus capable of producing heat. In the light of available evidence, it has absolutely no other specific action. The Council felt that, if this point was understood by the physician in general practice, he might hesitate before purchasing an expensive apparatus, because simpler mechanical means for the production of heat are available and as efficacious in many cases. For the specialist in physical therapy having a sufficient number of cases, the expense of a short wave diathermy machine might not be so important.

The question arose in the minds of the Council whether there was too much emphasis being placed on machine therapy. It was pointed out that the Council went on record several years ago to the effect that physical therapy consists of 90 percent intelligent handwork which may be accomplished by heat, massage and exercise, and 10 percent machine therapy. The short wave diathermy machine, for example, is a useful therapeutic agent, but in the light of the present day evidence its therapeutic effect is that of heat and heat only. The Council reaffirmed its stand to continue the consideration of all short wave machines submitted by the methods that have been followed during the last two years. If only minor changes have been made in accepted units, the Council decided that these alterations may be dealt with independently.

From the *Report of the Council on Physical Therapy*, Jour. A. M. A., April 3, 1937.

Thirteen hundred and two hospitals reported 2,382 physical therapists. The greatest number of physical therapists, 1,648, appears to be serving in general hospitals. Other types of hospitals reported as follows: mental, 350; orthopedic, 167; tuberculosis, 62; children's, 41, and all other institutions, 114.

Under the heading of physical therapy there is a variety of technical help, some of whom are skilled in general procedures while others specialize in massage, hydrotherapy, electrical or other forms of therapeutics.

From the *Sixteenth Annual Presentation of Hospital Data by the Council on Medical Education and Hospitals of the American Medical Association*, Jour. A. M. A., March 27, 1937.

The New York Post-Graduate Medical School recently opened a new physical therapy unit with Dr. John D. Currence as its head. The unit includes a special tank for underwater therapy.

Index to Current Literature

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Some Physical and Clinical Aspects of Ultrashort Waves. CONRAD K. GALE, M. D. Arch. P. T., Nov. 1936.

Interference With Radio Communication by Therapeutic Equipment. H. B. WILLIAMS, M. D. J. A. M. A., Nov. 28, 1936.

Treatment of General Paralysis by Ultra High-Frequency Heating. LELAND E. HINSIE, M. D., and JOSEPH R. BLALOCK, M. D. New York State J. Med., Dec. 15, 1936.

Chronic Endocervicitis and Treatment by Electrocoagulation. SYDNEY G. FINE, M. D. J. M. Soc. New Jersey, Sept. 1936.

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ABSTRACTS

John S. Coulter, M. D.

Ultraviolet Light: Modified Technique

From the Section of Dermatology, Proc. Royal Soc. Med., XXIX:12:1627, October 1936. By H. MacCormac, C.B.E., M.D.

The skin, it is now recognized, is an important, perhaps the most important, organ for the production of immunizing substances. It elaborates specific antibodies in response, for example, to the injection of vaccines; a non-specific reaction is also recognized following the action of ultraviolet light, and this seems to correspond with the degree of pigmentation. In the treatment of lupus vulgaris by ultraviolet light the results of the artificial method fall short of those obtained from natural sunlight, (for example, at Leysin), because the degree of pigmentation and the immune bodies of which it is the index are less fully developed. In the light department at Middlesex Hospital this question came under consideration, and Miss Caraman, one of the assistants, suggested oiling the patients with olive oil before the light bath. It is not suggested that there is anything novel in this procedure—it is followed by a large number of sun bathers, and there are various proprietary preparations in common use for this purpose. The results following oiling with olive oil have been very striking, a much more pronounced degree of pigmentation has been obtained and patients treated for lupus have made remarkable progresss where this technique has been used. The two patients exhibited illustrate the beneficial effects of this procedure. In both these cases the degree of pigmentation of the skin is well marked, and to this the unusually good results are attributed.

It is difficult to explain this paradox because the oiling would seem to screen the patient from the chemical rays. Professor Russ has kindly made some experiments for me on the effects of ultraviolet light on an oiled skin. Ohlmann, of Copenhagen, has suggested that there is a pigment-producing factor and an erythema-producing factor in the ultra-violet light spectrum, and if his view is correct it can be assumed that the olive oil cuts out the erythema effect, permitting larger doses with a greater degree of pigmentation. Professor Russ' experiments seem to disprove this theory, for he found that the oiled skin developed erythema to an equal degree with the unoiled skin. It is, however, a fact that oiled skin in lupus patients—and probably in normal people—does become more pigmented.

The Respiratory Responses of Pre-Adolescent Boys to Muscular Activity

Edward C. Schneider and C. B. Crampton (from the Department of Biology, Wesleyan University, Middletown, Conn.); in Am. J. Physiol., 117:4:577, December 1, 1936.

Summary

A linear relationship between the consumption of oxygen and load of work was not in evidence. With light loads the intake of oxygen was too large and with heavy loads too small.

The resting rate of consumption of oxygen increased with the growth of two boys and at the same time the delivery of oxygen during strenuous work was augmented.

During rest the minute-volume, frequency, and depth of breathing of pre-adolescent boys correspond to that of adults.

The amount of air breathed per minute and the depth of breathing during exertion are smaller among boys than among adults, while the frequency of breathing is greater among boys.

The respiratory dead space during physical exertion increases less in boys than in adults.

The ventilation equivalent for oxygen is somewhat larger for boys than for men.

During physical exertion the pulmonary alveolar oxygen pressure invariably rose,—the rise ranging upwards to 12 mm. Hg. Among men the alveolar oxygen pressure ordinarily shows no regular change.

The oxygen debt was never large. After six months of growth the debt with a heavy load was reduced.

Growth resulted in more favorable oxygen intake, in a larger lung ventilation, in a slower pulse rate, and in a larger oxygen pulse, both during rest and exertion.

In work carried to fatigue a steady state was ordinarily reached in all respiratory and metabolic factors; but the pulse rate, while maintaining a fairly steady state for a while, always showed some further accelerations with the onset of fatigue.

In recovery the metabolism returned to the pre-exercise level before the pulse rate. The slow return of the pulse rate and oxygen pulse indicated that strenuous exertion more profoundly disturbs the circulation than it does respiration and metabolism.

The Elliott Machine in the Treatment of Prostatitis

By Leander W. Riba, M.D., Chicago, Ill., in Ill. M. J., 70:5:444, November 1936.

The clinic patients comprised a group of cases which had been coming to the clinic for a period of one to five years. Their treatments had consisted of massages, sounds, instillations, and other routine measures. Cases were not selected, but for convenience were divided into seven groups:

Group 1. Chronic prostatovesiculitis, nineteen cases.

Group 2. Chronic prostatovesiculitis with multiple arthritis, sixteen cases.

Group 3. Chronic prostatovesiculitis with contracture of vesical neck, four cases.

Group 4. Adenoma of the prostate with infection, nine cases.

Group 5. Post-resection, eight cases.

Group 6. Acute gonorrheal prostatovesiculitis, eighteen cases.

Group 7. Miscellaneous group, six cases.

The results obtained in Group 1, nineteen cases, ages between 23 and 67 years, were as follows: Three became asymptomatic, one showed marked improvement, three moderate, and seven slight improvement. Five revealed no improvement and five left the clinic before any change in their condition was noted. In Group 2, six-

teen cases with arthritis, one became asymptomatic, six showed marked improvement, four moderate improvement, and five practically no improvement. In other words, eleven out of sixteen patients (or 73 percent) received moderate to marked benefit from these treatments. Seven patients were relieved of their acute pain, and two, who were almost totally incapacitated before beginning treatment, were entirely relieved. Six still had some residual stiffness of the joints. Four received no relief whatever. One was treated (at the request of the Orthopedic Department) without relief in spite of the normal prostatic fluid. The cases in Group 3 and 4 were surgical adenomas and contractures. It was noted that eleven patients obtained some amelioration of their symptoms, and two were unimproved (one had a vesical calculus). All but two of these improved cases returned within three months with some recurrence of their symptoms of frequency, urgency and nocturia. Group 5 consisted of nine resected prostatics who had residual symptoms of infection and retention. Three showed marked improvement, three moderate, and three only slight improvement. Of the last three, one had a contracted bladder, one was a cardiac, and in the other insufficient tissue had been removed. All patients showed some reduction in the prostatic cell count, and in five the urine became clearer, but none became asymptomatic. Nine of this group were private patients who had, in addition, local treatments as seemed warranted. Two of these had prostatic abscesses which ruptured intraurethrally. In three, the infection was present for two, four and twelve weeks respectively and had been treated elsewhere with intradermal injections. In these patients findings of marked periprostatitis and peri-seminal vesiculitis were noted. These nine private patients received an average of eleven treatments (two times a week to daily). Eight have been followed for at least three months, and in these there has been no recurrence. In the miscellaneous group, (Group 7), two cases of acute non-specific prostatitis cleared quickly on three and four treatments each. Both patients have remained well for four months. One case of urethrocysto-pyelonephritis in a three months' pregnant woman received marked benefit. After seven vaginal treatments she became asymptomatic and discontinued the treatments. One case of acute epididymitis improved a great deal with seven consecutive treatments by applying a specially constructed bag to the scrotum.

Kymographic Studies on the Influence of Brief Muscular Work Upon the Heart Function

By Borge Faber, M. D., and Hans Kjaergaard, M. D., in Acta Med. Scan., LXXXIX, Fasc. VI, 537, Sept. 19, 1936.

The physiologists in general stand united on the doctrine about the temporary physiological dilatation of the heart during work, whereas the roentgenologists have not been able to affirm this view. Naturally the question arises: What may be the explanation of this divergence of opinion between physiologists and roentgenologists? Undoubtedly it is to be looked for in the difference of the experimental conditions. The physiological views of the circulation are based chiefly on the findings in experimental studies on organs, above all in experiments with isolated animal hearts (frog heart (Bruns), mammalian heart (Straub, Starling)), and as pointed out by Lewis, it has never been possible for the physiologists by clinical working experiments to demonstrate an actual dilatation. Of course, the conditions in isolated organ experiments are far from being identical with the conditions in vivo, as the fine interaction between the many other influences to which the heart and circulation are liable in the living organism are naturally ruled out in the isolated organ preparations. Hence the results obtained with such preparations are not directly applicable to clinical conditions—something which seems not to have received sufficient attention. So the theory about the physiological dilatation of the heart appears not to be tenable. A priori, this theory is also hard to understand, partly because the inflowing venous blood presumably is under all too low a pressure to distend the ventricle, partly because the heart is not a suction pump.

As is evident from the x-ray picture, the increase of the beat volume in the working heart cannot be due to the increased diastolic dilatation. Hence, the comparison of the working heart to the highly tensioned bow that whips back to its original form, no matter how strongly it is pulled, is not a fitting illustration. The transverse diameter of the heart does not increase during the diastole; so the tension of the bow is not increased. And the systolic transverse diameter decreases even more than the diastolic transverse diameter; so the bow whips back not only to the "resting state" but even past this dimension. The idea of a passive dilatation of the heart as a cause of the increased minute volume is, therefore, to be replaced by a more active conception of the compensatory power of the heart. The increased beat volume is not due to a passive dilatation of the heart, but an active diminution of the heart with increased emptying power, and decrease in the rest volume of the heart must be the cause of the increased beat volume. Hence, we think, the concept of the physiological dilatation of the heart is to be given up and replaced by its contrast: the concept of the physiological diminution of the heart after work.

Ionization Method for the Treatment of Endocervicitis

Isador Forman, M.D., Philadelphia, in Am. J. Obstet. & Gynec., 32:3:503, September 1936.

Endocervicitis, undoubtedly a most common gynecologic condition, is very often erroneously treated.

The method of treating the infected cervix by ionization is the most recently adopted procedure in the gynecologic out-patient department of Temple University; namely, ionization of metallic copper in the cervix by means of a galvanic current that meets the prescribed criteria of ideal treatment.

Results

In the past eighteen months we have treated a total of 93 patients and have given 389 treatments. Of these, 71 patients were discharged as completely cured. The patient returns once in two months for a follow-up. There were six complete failures; these patients had a pelvic inflammatory disease with a palpable mass confusing the picture. Seven patients, after receiving the full course of six treatments, were relieved of the profuse discharge but, clinically, were not cured, a definite erosion with edema of the cervix being present. Two of these patients had also a complicating pelvic inflammatory disease. Nine patients did not return after the second treatment.

Although there was no particular benefit in those cases in which there existed a pelvic inflammatory disease there was no lighting up of infection as often occurs when the cautery is used in this type of case.

Conclusion

Our experience with this method leads us to believe that it approximates, more closely than any other thus far advocated, the ideal treatment for endocervicitis. The deposition of copper as copper oxychloride produces a marked bactericidal effect. The mild coagulating property of the positive current causes a shriveling and obliteration of the infected glands, while the technic of treatment keeps the cervix well dilated, bringing all the mucosa and the openings of the cervical glands in contact with the electrode and, what is more important, permitting adequate drainage.

Initial Cold Water Treatment for Burns

Hilton W. Rose, M.D., King City Hospital, Seattle, Washington, in N. W. Med., 35:7:267, July 1936.

Details of Procedure

When the patient is seen soon after the accident, cold water is applied to the burned tissue after as much clothing as possible has been removed. Ordinary tap water is used. In the case of small burned areas or a part of a single extremity, cold wet dressings are applied or the parts submerged in basins containing cold water. In the case of extensive burns, the patients are placed in a tub. When the face and the body are both involved, cold water dressings are applied to the face while the rest of the body lies submerged in the tub. The immediate results are spectacular. Patients with severe pain are relieved within a few seconds without the use of an opiate. Patients in early shock often respond promptly with no other measures, the weak and feeble pulse becoming slower and stronger, the blood pressure rising, and the patient's color resuming a normal appearance.

It is well known that severely burned patients may pass into shock quite rapidly, and that, if the surface burn is extensive, the patient is not likely to survive the shock of the first twenty-four hours.

"The primary phase" of shock is due to the pain of the direct nerve injury with its resultant reflex vasodilatation. The more important type of shock, however, is the so-called "secondary" shock which is due to the loss of fluids from the circulating blood. In the case of burns this has not been sufficiently appreciated.

Whether the shock in the initial phase (the first twenty-four hours) of burns is due to fluid loss or in part to pain, it is affected by the extensive capillary dilatation in the burned tissue itself, because without this capillary dilatation and extravasation of fluids, neither the loss of fluids nor the severe pain would be very marked.

The above reasoning is a theoretical explanation of the results obtained, and it awaits more accurate demonstration before we are sure that it is correct. The results, however, are no longer in doubt. Pain is relieved, and shock is prevented or lessened, if not too far advanced when the patient is first seen.

If some time has elapsed before the patient is first seen, so that the state of shock is rather far advanced, other shock therapy is started in addition to the cool water. Fluids by mouth are given immediately, and a transfusion of blood is started while the patient is still in the tub. If a donor is not available, intravenous acacia is used.

For the next two hours this treatment is continued. During this time the water is gradually warmed, as rapidly as the pain sensations of the patient will permit. The temperature of the water has been checked with many cases and the optimal temperature determined. The temperature of the water at first is between 60° and 70° F. At the beginning of the third hour it is about 98° F. At this time one fourth grain of morphine is usually given, preparatory to the mild debridement to follow. About one-half hour later the remaining pieces of clothing are removed, dead tissue and dirt are wiped away with gauze, and blebs are opened. When the tub has been grossly fouled it is emptied and refilled. If much dirt and grease are present, the body is scrubbed from head to foot with sterile soap and water. After the burned areas and body are clean, the patient is rinsed with sterile water and dried with warm air from an ordinary hair drier as described by Wells.

The patient is then ready for crusting. He is placed on a sterile sheet on the bed and is ready for Bettman's tannic acid and silver nitrate treatment or the ferric chloride coagulation method described by Coan. This next step and other subsequent procedures, such as the treatment of infected areas and later plastic repairs, are of at least equal importance to the treatment of the initial phase, but this paper is not concerned primarily with a discussion of these procedures.

Any attempts to remove adherent clothing and dirt, to do any other debridement, or to crust the patient before the initial phase of shock is over not only cause much agony to the patient but contribute directly to the severity of the shock.

Ischemic Pain in Exercising Muscles: Its Nature and Implications

Albert H. Elliott, M.D., and Richard D. Evans, M.D., Santa Barbara, Calif., in Am. Heart J., 12:6:674, December 1936.

The investigations of Sir Thomas Lewis and his associates on this subject, which have in the main been corroborated by many other observers, have laid the groundwork for our present conceptions which may profitably be summarized as follows:

1. Production of the pain substance is intimately concerned with the normal metabolic changes occurring during and after contraction of a skeletal muscle.

2. The pain substance is produced by a contracting muscle the circulation of which is free, but obstruction of the arterial flow, or decrease in the oxygen-carrying power of the blood, materially increases its speed of accumulation.

3. Under experimental conditions the phenomenon of muscular fatigue may be easily divorced from the occurrence of pain.

4. The pain substance is diffusible and under normal circumstances is rapidly washed away or destroyed. When the circulation is impeded, the substance which escapes from the muscle fiber may reach a concentration in the tissue spaces sufficient to stimulate sensory nerve endings. When circulation is reestablished, it is at once washed away and pain consequently ceases, but this does not necessarily mean that the metabolism of the muscle fiber has returned to normal.

The above facts seem well established. Further observations suggest that:

1. Of the factors which are operative in dissipating the pain upon return of the circulation to an ischemic limb, the bringing of oxygen is of importance as well as is the mechanical dilution or washing out. If the oxygen content of the inrushing blood is materially decreased, the pain persists or dies out slowly.

2. The oxygen content of the blood is also of importance in determining the rate of formation of the pain substance in that, if it be sufficiently lowered, concentra-

tion of pain substance may rise to the point of stimulating sensory nerves endings even if the circulation to the limb remains unimpeded.

3. Certain observations suggest that the substance may be produced, although extremely slowly, in resting muscles deprived of blood. The evidence here is indirect and requires cautious interpretation.

4. Recent studies have been offered as demonstrating that the pain substance can be trapped in resting muscles distant from its point of origin, but here again the evidence is not beyond criticism.

Conclusions

Our conclusions from the evidence herein presented are:

1. The substance or substances responsible for pain in exercising ischemic muscles are relatively stable, may be present in the blood stream for an appreciable period following their release from such muscles, and may diffuse into tissues distant from their point of origin.

2. Such substance or substances are produced likewise in nonischemic exercising muscles, and their concentration in the blood stream following vigorous exercise is materially increased for an hour or longer.

3. Increase of lactate ion in the muscles of the forearm, brought about by whatever means, uniformly enhances the origin of the pain substance produced by these same muscles.

4. Probably an increased concentration of lactate ion about the sensory nerve endings can, per se, produce pain, such increase not necessarily exceeding metabolic limits.

5. It is possible that lactate ion is solely responsible for the production of ischemic pain, but release of other substances, which are beyond doubt subject to similar metabolic laws, may play a role, and these should be investigated.

Hypersensitiveness to Cold: With Local and Systemic Manifestations of a Histamine-Like Character; Its Amenability to Treatment

Bayard T. Horton, M. D., George E. Brown, M. D., and Grace M. Roth, B. S., Fellow in Physiology, the Mayo Foundation, Rochester, Minn. In J. A. M. A., 107:16:1263, October 17, 1936.

Danger lurks at the bathing beach for those who are hypersensitive to cold, but the danger can be eliminated by adequate desensitization. We do not pretend that, scientifically, this is the most interesting implication of the present report; we do believe that now, with summer almost at hand, it is the most immediately applicable feature of our work.

Treatment

These patients are amenable to treatment. Systemic desensitization to cold can be accomplished by having the patient immerse a hand in water at 10° C. for from one to two minutes twice a day for from three to four weeks. This, we believe, is sufficient to immunize the average subject: even patients who had swelling of the lips and tongue following the eating of ice cream, in addition to local swelling of the hands and face from exposure to a cold environment, have obtained complete relief by this method of treatment. Also, by daily immersion of the hand in cool water, starting at 65° F. and decreasing in temperature to 45° F. for increasing periods, excellent results have been obtained. Of the twenty-two patients we have studied, sixteen are completely well and five are improved. The remaining patient did not receive treatment. Patients also can be desensitized to cold by subcutaneous administration of 0.1 mg. or less of histamine twice daily for from two to three weeks.

Summary

Of the twenty-two subjects in our series, fourteen had systemic reactions. Eleven of the fourteen subjects who had systemic reactions developed syncope; the syncope of nine of these eleven subjects occurred after swimming and four of the nine had to be rescued from the water. From the literature, we have gathered records of seventy-six cases of hypersensitiveness to cold (not including seven of our own cases which have been reported previously). Twenty-nine of these subjects had systemic reactions and eighteen of the twenty-nine developed syncope; the syncope of fifteen of these eighteen subjects appeared after swimming. Four of these fifteen subjects had to be rescued from the water. All together, this constitutes a series of twenty-four cases of syncope following swimming. Eight of these subjects had to be rescued from the water, this emphasizing our original statement that "Danger lurks at the bathing beach for those who are hypersensitive to cold."

Short Wave Diathermy in Heating of Human Tissues

John S. Coulter, M. D., and Stafford L. Osborne, B. P. E., Chicago. In Arch. Phys. Therapy, XVII:11:679, November 1936.

Conclusions

1. In the added studies with diverse wavelengths of short wave diathermy, it was observed that in heating live human muscle and fat there were no significant differences in the use of 6, 12, 15, 18 and 24 meter wavelengths when using the cuff technic of the electric field method, and no significant difference in the use of 12, 18, 24 and 25 meter wavelengths when using the coil technic of the electromagnetic field.

2. In the studies of tissue heating with air-spaced electrodes with the electric field, the efficiency of heating is dependent upon the size of the electrodes, the energy available from the apparatus, the method of application, the distance of the electrodes from the skin, and the patient's tolerance.

Care of the Feet After Bunionectomy

Leo J. Miltner, M.D., Peiping, China, in J. Bone and Joint Surg., XIX:1:235, January 1937.

Following bunionectomy, an important part of the physical therapeutic care of the feet is the reeducation and redevelopment of the intrinsic muscles of the feet, especially of the interossei, of the abductor digiti quinti, and of the abductor hallucis. Correct footwear is necessary, but, even though worn, it will not necessarily prevent a recurrence of the deformity unless the small muscles governing the toes are restored to power. Therefore, after operation, the patient should be instructed to perform a long course of exercises. In many instances, before operation almost complete atrophy of the intrinsic muscles may be seen; after operation and two or three months of exercises, these same muscles usually show a very surprising return of active ability to abduct and adduct the toes.

The accompanying photographs illustrate the Japanese type of stocking and sandal, the use of which has proved very helpful in carrying out the above exercises. With this slipper the patient is enabled to walk as soon as the wounds are healed. The elastic straps hold the great toe in the desired position of correction during walking. In addition, the toes are allowed considerable freedom, so that during walking the patient may perform active exercises, especially adduction and abduction of the toes.

Observations on the Use of Acetyl Beta Methylcholine Chloride in Chronic Arthritis

Douglas Boyd, M. D., Stafford L. Osborne, B. P. E., and David E. Markson, M. D., F. A. C. P., Chicago, Illinois. In Ann. Int. Med., 10:6:728, December 1936.

The pharmacologic reactions due to acetyl beta methylcholine are prompt and vigorous and are similar to those which follow stimulation of the parasympathetic nerves. There is well marked peripheral vasodilation. This latter action has been investigated as to its value in conditions accompanied by, or due to, vascular spasm. We undertook this present problem to ascertain the effect of acetyl beta methylcholine on the peripheral circulation. A group of 25 patients from the arthritis clinic of Northwestern University Medical School was selected. Although we are not convinced that there is a causal relation between the circulatory changes in arthritis and the joint lesions, we do know that circulatory disturbances accompany and aggravate the disease. This has been shown by Pemberton and others.

We gave acetyl beta methylcholine to our group of patients by the common ion transfer method, which in effect gives a slower, more gradual absorption from the superficial tissues. The constitutional effect of the drug appeared and in addition there was obtained a striking local reaction consisting of increased skin temperature, sweating, gooseflesh, faster capillary flow and a diffuse pinkness of the skin over the area covered by the positive electrode. This reaction, we feel, is quite different from and more lasting than that of local counter-irritation. We feel that our controls demonstrate that it is definitely a local drug effect. This local effect at times lasted for 12 to 24 hours. We consistently found a decreased skin temperature distal to the treated area, whereas proximal to the treated area we always observed a rise in skin temperature of 2 to 4° F. This makes it necessary, when local effect on the hand is desired, to apply the positive electrode on the hand itself and not on the forearm proximal to it. These marked local effects furnish the rationale for the use of acetyl beta methylcholine in this manner in arthritics.

We found that the drug consistently produced characteristic general reactions, which included a fall in blood pressure averaging 12 millimeters of mercury, and a rise in pulse rate averaging 22 beats per minute. Respiratory rate was changed not at all, but most patients described a sense of heaviness in the chest and inspired deeper. A flushing of the face, neck and ears occurred in all who experienced general reactions. Perspiration was usually marked, particularly about the face and neck, even in those who claimed to have had no perspiration in several years. Increased salivation and occasionally lacrimation lasted one to two hours. One patient had increased saliva after each treatment for 12 to 24 hours. Body temperature by rectum, taken by mercury thermometer and by thermocouple, showed no change.

Conclusions

1. Twenty-two cases of arthritis have been treated with acetyl beta methylcholine common ion transfer.
2. Eight of 14 patients whose hands were treated showed an increased flexibility in function and usefulness in these hands.
3. Pain was relieved in some cases.
4. Muscular fatigue was markedly relieved in almost all cases adequately treated.
5. Increased endurance was experienced by those completing the course of treatments.
6. Circulatory changes were graphically shown.
7. The group of failures were in general the elderly patients with far advanced rheumatoid arthritis with bone changes and fibrosis.
8. Patients with circulatory disturbances of the extremities,—those with cool, pale, moist, and often cyanotic hands and feet,—gained most from treatment.
9. Maximum effects were gained after a series of 18 to 20 treatments.

The Treatment of Allergic Rhinitis: With Particular Reference to Ionization and the Control of Chronic Vasomotor Rhinitis

L. W. Dean, M. D.; Lloyd D. Linton, B. S.; H. M. Smit, M. D.; L. W. Dean, Jr., M. D.; and Charles Mahoney, M. D., St. Louis, in Jour. A. M. A., 108:4:251, Jan. 23, 1937.

Results of Ionization

Wenner demonstrated that so-called ionization was in reality iontophoresis; that the zinc ions actually penetrated the skin and cartilage of the rabbit's ears during the process of ionization.

Linton made intramucosal tests before and after iontophoresis. If the patient gave a positive intramucosal reaction before ionization, he always gave a positive reaction after the treatment. Some patients who received relief from allergic rhinitis by the use of iontophoresis did not react to the topical application of allergens to the mucosa, but they always reacted to the intramucosal injection of ragweed pollen if they were ragweed hay fever cases. He secured a reaction in one case as early as eleven days after iontophoresis. He has since noted that trauma and other procedures in the nose influence the reaction of the mucous membrane to allergens; that is, for instance, the removal of polyps, submucous resection and the like may interfere with the reactions when intramucosal tests are made. He has also noted that local desensitization of the mucous membrane may result from the injection of an allergen. For example, in a case of hay fever in which ionization has been done, an intramucosal injection of ragweed pollen was given to test the sensitivity of the mucous membrane. This resulted in a terrific attack of hay fever, which could be controlled only by an injection of epinephrine. A repetition of this injection ten days later produced no reaction. It has been noted many times that intramucosal tests in allergic rhinitis may themselves produce a clinical improvement.

Smit studied the tissue changes following zinc iontophoresis. His observations are as follows:

Summarizing the tissue changes which one finds following zinc iontophoresis, there occur: coagulative necrosis of the epithelium; early stages of inflammation with polymorphonuclear leukocytes which are later replaced by round cells; atrophy of glands and loss of glands; metaplastic changes in glands and ducts; formation of stratified spuamous epithelium which later returns to normal ciliated columnar (if there is not a chronic inflammatory process present); fibrosis of tunica propria; dehydration of edematous tissue; fibrosis of blood vessels, and in some cases cartilaginous necrosis.

Boling, working in the department of cytology at Washington University School of Medicine, showed that following ionization of the sheep's nose there was a complete regeneration of the ciliated epithelium. Wenner has made the same observation on cats. In the human subject, probably because of the fact that we were dealing with chronic inflammation of the mucous membrane in the beginning, we have always found areas of per-

sistent squamous cells following the ionization. Biopsies were made from the same area on the inferior turbinate before and after ionization. Before ionization the cells were all ciliated. One month after ionization no ciliated epithelium was present—the epithelium being all stratified squamous. Three months after ionization the only ciliated epithelium found is in a small depression in the mucous membrane, which may have caused the epithelium at that point to be unaffected by ionization. It is true that the more insult there is to the nasal mucous membrane the more stratified epithelium will be found. Theoretically, it is to be expected that, following the necrosis of the superficial tissue that occurs with ionization, there will be more squamous epithelium than before.

During the last year we have been interested in the activity of the cilia of the cells that were regenerated following ionization. One patient had particularly good cilia in the microscopic section of a biopsy after ionization. Some of these cells were removed and studied by Miss Pfingsten. She compared their activity with the activity of the cilia of normal cells and also the length of time that the cilia beat when kept in nutrient solution in the culture chamber following removal. The activity and the length of time that they beat were practically the same in the normal and regenerated ciliated cells. This patient had been ionized some eight or ten months before because of a chronic vasomotor rhinitis. The mucous membrane of this patient was much drier than normal. Several members of the staff looked at this patient's nose and all agreed that, while the cilia might be beating in the lower layer of mucus, the mucus covering the membrane was so dry that it was impossible for the cilia to produce any movement on the surface.

We have had the opportunity of studying the influence of ionization on the absorption of allergens by the nasal mucosa in only three cases. It is interesting at least to note that in two cases there was no evidence of absorption at all of the ragweed pollen through the mucous membrane of the ionized nose, while in the third case the absorption was delayed. Further studies during the last year on the human nose, taking biopsies before and after ionization, have suggested that the final results of ionization were fibrosis and thinning of the tunica propria; that the basement membrane is thicker and more dense; that there is a hyperplasia of the epithelium with increase in metaplasia; that very few goblet cells are present; that sometimes there is a thickening of the vessel walls, particularly the capillaries; that the number of eosinophils in the tissue is not decreased, and that the secretory glands are partially destroyed.

Some of the acini of glands appear to be completely obliterated by cellular hyperplasia. In others the secretory cells are atrophied. Marked inflammation may be present around the acini. These changes result in an interference with the secretory function of the nasal membrance, and the membrane does not swell as easily as it did before. Biopsies taken from the human nose are necessarily superficial. Periosteal changes have been found in the occasional biopsy in which a piece of bone was secured. In human biopsies the cartilage of the septum could not be studied. In dogs and guineapigs, some cartilage cells were killed by the ionization.

We have proved to our satisfaction that ionization does not change the allergic status of the body in any way. While dusting allergens in the nose may not cause a reaction after ionization, the tissues of the nose always react as before ionization to the intramucosal injection of allergens. With intramucosal tests there is a difference; namely, the tissues do not swell as before. There is no change in the reagin content of the blood. It has been found, however, that, by using different individuals to test the reagin content of the blood and by using the same blood, different results may be secured. This may explain the suggestion that has been made that the allergic status of the individual is changed by the ionization.

We do not find it necessary to use ionization for the control of hay fever. It is used to control the chronic vasomotor rhinitis that persists after the hay fever season. It is interesting to note that we had on September 1st, 1936, in our research clinic five patients who were ionized one or two years ago for hay fever with unsatisfactory results. One of these patients is doing very well with desensitization, diet, hormones and the like. The other four are not doing well. The patients who are highly sensitive to ragweed pollen, those who have plus 4 reagins in the blood stream, are very difficult to handle with any kind of treatment except the avoidance of allergens. All other hay fever patients in the clinic are doing well with desensitization, diet, avoidance of other allergens to which they are sensitive, correction of endocrine dyscrasias, and other measurees.

We have used ionization for the control of chronic vasomotor rhinitis when other forms of treatment have failed. It has been used when all the mucous membrane of the nose and that on the septum and in the mearuses, as well as on the turbinates, is boggy.

Thermal Therapy in Chronic Disease

Richard Kovacs, M.D., New York City, in New York State J. Med., 37:2:174, January 15, 1937.

In the pathology of chronic disease, the most characteristic phenomenon is the apparent inability of the human engine to re-establish normal functional and structural conditions. Physical agents have played a role in the fight against chronic disease and infirmity since the early days of mankind, and thermal agents have been in the forefront among them. The colonizing legions of the Roman Empire erected thermal establishments of a uniform pattern all over Europe, and sufferers from chronic diseases became pilgrims to these and other hot spas. In the centuries of evolution since, thermal measures continued to be most popular for assisting the natural forces of restitution in the combating of chronic diseases. Clinical and experimental research and present day physical science have greatly enlarged their scope and effectiveness.

The most important group among chronic diseases in which thermal measures form an indispensable part of treatment are chronic arthritis and rheumatoid conditions. "Rheumatic exudations are smouldering foci of disease, and heat, properly applied, often affects their absorption."

Heat therapy in chronic arthritis is applied from two distinct angles. General or systemic heating is part of a "constitutional" therapy. By stimulating general circulation and increasing body metabolism it ameliorates the arthritic diathesis, and though local changes are only indirectly effected, in many instances following general heat-treatment there is a decrease of pain and swelling in all affected parts. Local heat-treatment has as its object the increase of local blood and lymph circulation and local tissue metabolism, the promotion of resorption and restoration of function. An even more important effect of suitable local thermal application is the relief of pain—the symptom which is the most bothersome and most depressing, next to stiffness and limitation of motion. In selecting thermal measures, the type of arthritis and the constitution of the patient has to be taken into consideration. Generally speaking, robust patients of

the osteoarthritic type respond well to both local and general heating while in the rheumatoid type of arthritis and in asthenic patients, vigorous heat measures often prove exhausting.

The simplest and most easily available thermal measure for general treatment of chronic arthritis is the hot bath. It may be used in the home at a temperature from 96 to 102° F. two to three times a week from five minutes to half an hour. A series of hot baths, alternated with or followed by suitable local treatment, is usually the backbone of physical treatment of chronic arthritis in health resorts. In physicians' offices, light baths from high wattage incandescent lamps and, in institutions, electric light cabinet baths prove useful. Hyperpyrexia by various methods has been extensively employed in recent years; in the majority of cases of rheumatoid arthritis it has not given encouraging results.

Gonorrheal infection, both acute and chronic, has proven to be perhaps the most successful object of thermal therapy, especially since the advent of hyperpyrexia. Local diathermy applied, as a rule, to the focus of gonorrheal infection, the cervix, urethra, prostate or seminal vesicles, at other times to the secondarily affected joints, produces good results in a fairly large percentage of cases. By hyperpyrexia, practically all cases of gonorrheal arthritis which are resistant to focal and local diathermy can be cleared up. Bierman and Horowitz have shown that the elevation of systemic temperature to 105-106°, combined with raising the pelvic temperature to 110-112°, gives brilliant results in gonorrheal infections of the pelvis. By determining the thermal death time of gonorrheal strains in the individual, the ideal of a single fever treatment of sufficient length is attempted, resulting in a bacteriological cure and an immediate subsidance of all clinical symptoms.

In chronic circulatory disorders there is a large field for thermal therapy. Cardiac diathermy enhances the tone of the heart muscle, improves the subjective signs of its vasomotor disturbances and thus offers valuable aid in treating chronic coronary disease. In essential hypertension autocondensation, a form of general high frequency treatment has proven useful but exerts no specific effects. In peripheral circulatory disturbances of the spastic type, such as Raynaud's disease and intermittent claudication, moderate local heating by whirlpool baths or by diathermy often gives marked symptomatic relief. The same treatment is useful in early stages of arteriosclerosis and thromboangiitis obliterans; in advanced cases it is better to employ only mild external heating from radiant sources kept around 94° F., regulated according to individual tolerance and applied practically continuously.

Death From Hyperpyrexia in Heat Treatment of Syphilis

Letter to the Editor of J. A. M. A., 108:2:138, Jan. 9, 1937.

Nov. 29, 1936, the patient was told to report to a physical therapy technician who has given more than 500 hyperpyrexia treatments and has treated other patients of mine with excellent results. The method of application was through the *electric blanket*. The time, temperature by mouth and pulse were as follows:

A temperature of 106° F. by mouth is equivalent to 106.6° or 106.8° by rectum. At such temperatures a moderate amount of physical exertion may cause a rapid elevation of fever. When the heart first showed evidence of weakness, the patient probably developed restlessness, mania or even convulsion, with a substantial increase in heat production due to muscular work and a rapid rise in body temperature. Efforts made to cool such a patient rapidly by applying cold to the skin produce marked vasoconstriction, effectively preventing heat radiation. What happened in this case is unknown, but the following sequence of events has been observed three times and may be analogous to the case under discussion: During the course of a fever treatment at 107° F. which had been well tolerated up to this time, the patient suddenly became restless and uneasy and the temperature began to rise. In ten or fifteen minutes patient became disoriented and maniacal and soon lapsed into deep coma. While efforts at resuscitation were being made, the respirations became shallow and infrequent, the blood pressure fell to a very low level, even to zero, and the peripheral pulse became imperceptible. The skin was hot and cyanotic and the rectal temperature rose to over 109° F. Precordial activity was increased and the heart was very rapid with a rate of 180 to 200 per minute, but the heart sounds were of good quality. Except for the fever and the hot and cyanotic skin, the condition strongly suggested profound surgical shock.

It seems evident that death in this case was due to hyperpyrexia. The diagnosis of hypersusceptibility to heat, however, seems unreasonable. This patient was able to tolerate a very high body temperature for several hours. It seems likely that he died only after his body temperature reached an extremely high level, a level which frequently causes death in cases of heat prostration. Death probably resulted from anoxemia due to circulatory and respiratory collapse. A satisfactory pathologic diagnosis in such cases often cannot be made. Death occurs so rapidly that organic changes are scarcely to be expected and even passive hyperemia may be slight or absent. Because of the circulatory collapse, petechial hemorrhages are not produced.

Methods of Treatment of Obesity

Herbert Coombs, M. A., B. Sc., Ph. D., M. D.; Dorothy Reader, M. B., Ch. B., and Charles Catlin, M. B., Ch. B. In The Practitioner, CXXXVIII:1:95, January 1937.

The treatment of obesity by dietetics is fundamental and quite the most important method available. Without some control of the diet all other methods are likely to fail.

Exercise

Another fundamental method of attacking obesity is by the inauguration of proper exercise. Many obese patients, for reasons of drowsiness, laziness or fear of ridicule, take the minimum of exercise. This has been noticeable when women especially, although enjoying swimming, have refrained from this pastime because of the fear of attracting attention. Patients must be encouraged to increase their activity gradually, and dancing, swimming, walking and golf are particularly to be recommended. Douthwaite has recently stressed the great value of the "Culture of the Abdomen," and there is no doubt that exercises for this purpose are of the greatest value. As more exercise is taken patients often begin to discard excess clothing which tends to restrict their movements, and this also has a beneficial effect on their health.

Glandular therapy is often used in conjunction with dietetics and exercise, and usually fails unless these are carefully controlled.

Physical Therapy

Physical therapy is a useful adjunct to the treatment of many diseases and obesity is no exception. A masseuse sees the patient at relatively short intervals and can do a great deal to stimulate and maintain interest in all forms of treatment. In this way she is extremely valuable, but there is a considerable amount of truth in the statement that the only person who loses weight by massage is the masseuse.

Other Methods

Treatments involving Turkish baths, diuretics (generally those containing mercury), and purging, are often recommended, but they should be employed only under medical supervision. In general, they are more suitable for patients suffering from cardiovascular-renal disease than for cases of obesity. However, many authorities believe that a small proportion of patients suffer from a "water-salt-retention" form of obesity which is probably related to pituitary-cerebral dysfunction, and such persons benefit from the above procedures.

Rest and Exercise in the Treatment of Patients With Heart Disease

Ernst P. Boas, New York in Med. Rec., 145:1:17, Jan. 6, 1937.

We must aim to teach the cardiac patient an unhurried free activity, and with it a sense of leisure. It is the everlasting rush from one place to another, from one task to the next, that is wearing and that causes undue strain. We must endeavor to recast the patient's whole outlook upon life, for intemperance in the psychic sphere also overstrains the heart. His mode of life must be so planned as to avoid symptoms of cardiac distress. This is by no means an easy task. It requires, on the part of the patient, a full understanding of the problems arising from his cardiac defect as well as of the measures that may prevent its progress, combined with resolution and optimism; on the part of the physician it calls for sympathetic guidance based on a knowledge, not alone of the heart disease, but of the personality of the patient, and a knowledge of his peculiar emotional, social and economic determinants. It is rarely necessary or advisable for the patient to retire from work.

Most patients with heart disease are better off if they continue at work. The degree to which they can do so depends upon the amount of their cardiac incapacity and the nature of their work, as well as depending upon their own temperament and that of their employer. Complete retirement, particularly when it is made possible by an insurance policy for total and permanent disability, has a most demoralizing effect. The patients learn to live just for their hearts and become apprehensive and self-centered. It is doubtful how much such a sheltered existence contributes to the extension of life, and it is certain that it does not add to the happiness of the patient or his family.

Those who labor at heavy manual occupations must, of course, change their work. Even if for the time being they can work without symptoms, the undue strain will certainly accelerate a cardiac breakdown. Such a change of occupation often involves a most difficult economic and social adjustment. Factory workers who operate machinery usually can carry on without appreciable harm to themselves, if the conditions and hours of work are reasonable. These patients often report that they have no symptoms while at work, but that, in a city like New York, the long subway travel to and from the factory causes distress. This obtains particularly in those subject to angina pectoris.

Restriction of Exercise in the Treatment of Heart Disease

Louis B. Laplace, M. D., Philadelphia. In Pennsylvania M. J., 40:4:264; January 1937.

In deciding which types of activity should be forbidden, the following considerations should be borne in mind:

1. Activity which is accompanied by emotion is a greater strain upon the heart than a corresponding degree of effort in which there is no emotional reaction. Emotion is believed to precipitate heart failure by stimulating the secretion of adrenalin and by overactivating the autonomic nervous system.

2. Certain types of exertion are harmful by causing sudden changes in the blood volume of the chest. Bending of the body, stooping, or the lifting of heavy loads involves compression of the abdomen and the expulsion of a large amount of blood from the splanchnic reservoir into the lungs. This sudden congestion is capable of producing acute pulmonary edema.

3. Individuals vary in the reaction of their circulation to any particular type of physical effort. A person who is accustomed to a certain task can perform it with less strain on the heart than one who is not so accustomed.

4. Enthusiasm and unforseen contingencies must be considered in restricting certain kinds of activity. Young women with rheumatic heart disease may wish to dance. Slow, conservative dancing is quite permissible if compensation is well established. Often, however, such a patient becomes so exhilarated as to forget or ignore the physical limitations and an acute cardiac failure is the result.

A common problem is whether or not a cardiac patient should be permitted to drive a car. As a rule there is little or no strain attached to driving slowly along a country road. Driving in city traffic, however, involves a considerable physical and mental effort, and parking a car constitutes a very severe strain indeed.

In the subsequent chronic stages, patients who have once had congestive failure or who have enlarged hearts or complain of precordial pain should be forbidden any vigorous exertion, such as running or rapid stair climbing. In the well-compensated child, however, greatly restricted exercise is scarcely justified by the therapeutic results. Such individuals rarely strain their hearts by voluntary activity for, as Sir James Mackenzie has pointed out, they are kept safely within the limits of their exercise tolerance by the breathlessness caused by their valvular lesion. Children of this type may be forbidden to indulge in strenuous competitive sports or to perform in strenuous competitive gymnastic feats which produce sudden strain or to continue an exertion once breathlessness has developed. Otherwise, however, there is no valid reason why they should not be permitted any type of play which they can tolerate without discomfort. It is quite likely that by so doing they improve the physiologic effiiciency of the circulation and help to lessen the strain which any muscular effort exerts upon the heart.

Heart disease of middle and later life is most commonly associated with hypertension or arteriosclerosis or both. In such cases the presence of congestive failure is an indication to cease all ordinary activity.

Everything considered, therefore, the patient whose signs or symptoms of cardiac disease do not appear to be serious may be permitted any activity which he has been accustomed to perform without discomfort.

Book Reviews

HOME TREATMENT OF SPASTIC PARALYSIS. By Percy Merritt Girard, M. D., F. A. C. S., Chief of Orthopedic Service, Parkland Hospital, Assistant Chief Surgeon, Texas Scottish Rite Hospital for Crippled Children, Dallas, Texas. Foreword by Earl R. Carlson, B. S., M. S., M. D., Director of Department of Rehabilitation of Motor Disorders, New York Neurological Institute. Cloth. Price, $2.00. Pp. 130 with 77 illustrations. Philadelphia and London: J. B. Lippincott Company, 1937.

This book is written for the parents of spastic children. It is impossible for the physician or physical therapist to write complete directions for the necessary home treatment of these cases. This volume gives in the simplest terms a description of spastic paralysis, advice to the parents on facing the problem, the prevention and correction of deformities, teaching relaxation and coordination by physical therapy, exercises, speech training, teaching relaxation and coordination by occupational therapy and finally considers the relation of the spastic child to other children.

Girard presents the exercises and treatment instructions that he has used in treating 875 cases of spastic paralysis. The book is well illustrated, and the exercises are described so they can be done easily at home without elaborate equipment. It can be highly recommended.

L'ACTION DES RAYONS ULTRA-VIOLETS ET DES RAYONS X SUR LES NERFS PERIPHERIQUES. By Jacques Audiat, Doctor of Science. Paper. Price, 25 francs. Pp. 88 with 23 illustrations. Paris: Masson & Cie, 1935.

Among the theories that have been proposed to explain the biological effects of ultra-violet in x-rays upon the higher organisms, there are some which lean towards an effect upon the peripherous nervous system without, one must admit, a very strong experimental basis. Independently of the fact that ultra-violet rays do not penetrate beyond the first layers of the skin, it seems that little effort has been spent to determine if nerves are affected by this type of irradiation. As to x-rays, general opinion indicates that they have little influence upon the function of nerve tissue. This book fills the gap of our knowledge on these subjects.

Through the use of a simple technic protected against any error of interpretation, Dr. Audiat supplies the demonstration that under proper control both ultra-violet rays and x-rays affect nerves to the point of complete suspension of their susceptibility to excitement. However, he does not stop with his effort to establish this important fact. He goes on to study the modalities and attempts to fully appreciate the mechanics involved. Minute observation of the various stages of the process under study supplies evidence of a period of inaction and indicates the manner in which the phenomenon varies with temperature. More critical and delicate tests have made it possible to determine also the rest potential under the effect of radiation to follow the path of activity through the affected region and to find by spectral photometric analysis chemical alterations in the nerve substance.

The conclusion drawn from these diverse methods of investigation is that the radiations employed bring about reactions which continue after irradiation has been stopped.

In line with thermo coefficients, one must admit the probability of the existence of primary action of a photochemical nature on which is superimposed a secondary process of physical or chemical order. The consequence of these molecular modifications appears to be depolarization of the nerve, bringing about progressive weakening of action energy (current) during its course. At least, this is what is suggested by the experience which consists of reestablishing conduction in a previously irradiated nerve by means of an auxiliary electrical current.

THE PATHOLOGY OF INTERNAL DISEASES. By William Boyd, M. D., F. R. C. P., Professor of Pathology in the University of Manitoba; Pathologist to the Winnipeg General Hospital, Winnipeg, Canada. Second Edition. Cloth. Price, $10.00. Pp. 904, with 335 illustrations. Philadelphia, Pa.: Lea & Febiger, 1935.

Most text-books of pathology present the morbid anatomy and histology of diseased organs in objective description, leaving much of the interpretation of such lesions to treatises on medicine. To have a work in which the relations of clinical symptoms to lesions are presented in addition to the usual description of pathology is highly desirable. Such a treatise is Boyd's "Pathology of Internal Diseases" now in its second edition. The clinical and physiologic aspects of disease receive chief attention and as a result the subject matter is given a vitality not found in the more common texts of pathology.

In order, chapters deal with diseases of the heart, arteries, respiratory systems, stomach and duodenum, intestines, liver and gall bladder, pancreas, kidneys, adrenal glands, the endocrine glands, diseases of the blood, bone, marrow and spleen, of the lymph nodes and thymus gland and a final chapter on diseases of the nervous system.

Keeping abreast of recent advances in medicine and physiology, the author has included new sections on circulatory failure, the mechanism of cardiac pain, coronary disease, hypertension, endocrine disorders and many other disease syndromes.

Frequent references to newer researches with careful criticisms by the author give to this work an additional appeal. This volume should be of considerable value as a reference text of this important subject for students and physicians.

PRACTICAL SUGGESTIONS ON POLIOMYELITIS. By the Special Committee on Poliomyelitis Exhibit. Paper. Price, 15 cents. Pp. 57. 1935 Edition. Chicago: American Medical Association, 1936.

The purpose of this pamphlet is to summarize the essentials concerning the handling of poliomyelitis by the physician. It covers the isolation and quarantine, the diagnosis, and the treatment. There are four pages of line drawings illustrating the muscle functions, and chapters on important rules in the after-care of poliomyelitis and muscle training. These make it a pamphlet that should be read by every physical therapist.

THE MASSEUR'S COMPANION. By Arthur J. Bowman, M. I. C. M., B. P. A., M. B. A. Ch. Cloth. Price, 5/-. Pp. 96. London: The Actinic Press, Ltd., 1936.

This is a small book intended for those practising the art of massage. It lists those diseases in which massage and exercises may be used. A brief note under each disease gives the causes, symptoms, treatment, and the massage treatment.

MUSIC IN INSTITUTIONS. By Willem van de Wall, Doctor of Music, Director of the Committee for the Study of Music in Institutions, Lecturer School of Music Education, Teachers College, Columbia University. Assisted by Clara Maria Liepmann, Doctor of Jurisprudence. Cloth. Price, $3.00. Pp. 457, with 15 illustrations. New York: Russell Sage Foundation, 1936.

The ideas presented in this volume are the outcome of the practical work accomplished over a period of many years by the author who is a member of the Bureau of Mental Health of Pennsylvania. The author has worked out methods of applying his musical knowledge and skill to the emotional problems of human beings who are lodged in hospitals, reformatories, or schools for defectives. It is an original work on a systematic presentation of the aims, methods and cautions to be observed in the field of music in occupational therapy as an integrated detail in a coordinated plan of hospital treatment.

The function of music in institutional care and treatment, the aims and scope of musical activities in various institutions, the organization of institutional musical activities, the institutional music worker, the administration of a department of music and the coordination of this department with the work of other departments are discussed.

The volume is well printed, illustrated and indexed, and there is an excellent bibliography. It can be recommended to all interested as the most complete book on the use of music in welfare work.

SKIN DISEASES IN CHILDREN. By George M. MacKee, Professor of Clinical Dermatology and Syphilology, and Anthony C. Cipollaro, M. D., Associate in Dermatology and Syphilology, New York Post-Graduate Medical School, Columbia University, New York. Cloth. Price, $5.50. Pp. 345 with 153 illustrations. New York: Paul B. Hoeber, Inc., 1936.

In this volume the diseases are conveniently grouped, partly etiologically, partly pathologically and partly because of clinical similarity. The following chapter headings illustrate this original method of grouping: those due to fungi and animal parasites; the erythema group; drug eruptions; the eczema group; scaling dermatoses and lichens; benign and malignant new growths; congenital defects; injuries due to physical agents; vesicular and bullous diseases; the tuberculosis group; diseases caused by bacteria; dystrophies; pigmentary affections; diseases of the sweat glands; sebaceous glands; hair and nails; vascular diseases; diseases of the mouth; care of the normal skin and syphilis.

Eruption characteristics are given in detail, and differentiation is made when the diagnosis is difficult. Etiological factors, both internal and external, are emphasized, especially in relation to treatment. Approximately all therapeutic methods and indications for the described dermatoses are mentioned. This book can be recommended.

ARTHRITIS IN WOMEN. By R. Fortescue Fox, M. D., F. R. C. P., F. R. Met. Soc., President of International League Against Rheumatism. Paper. Price, 2 s. 6 d. Pp. 36. London: H. K. Lewis & Co., Ltd., 1936.

This small monograph is a clinical survey of arthritis in young women, climacteric arthritis and osteoarthritis in women. There are three pages on an appeal for rest houses for rheumatoid arthritis. Dr. Fox is a well-known authority on chronic arthritis and this monograph is of value to those interested in this subject.

THEORY AND PRACTICE OF PSYCHIATRY. By William S. Sadler, M. D., Chief Psychiatrist and Director, The Chicago Institute of Research and Diagnosis; Consulting Psychiatrist to Columbus Hospital; Fellow of the American Psychiatric Association; and Member of the American Psychopathological Association. Cloth. Price, $10.00. Pp. 1256. St. Louis, Missouri: C. V. Mosby Company.

A treatise on the difficult subject of psychiatry of necessity covers many, many pages. Sadler's "Theory and Practice of Psychiatry" is no exception. The author attempts to cover the whole subject of the neuroses and psychoses in one volume, including also several chapters on child psychology and the problems of childhood and adolescence. The first portion of the book is devoted to a consideration of the various theories of the etiology of mental disorders. This is followed by a review of the development of personality with an attempt to present the chief problems of adjustment which may be responsible for the development of abnormal behavior. There is much material on the various phases of the neuroses which may be of value. The major psychoses are discussed in a comparatively few pages.

There is considerable repetition throughout succeeding chapters which lessens the value of this presentation as well as giving unnecessary padding to the volume. The author, recognizing the need for stressing therapy, devotes much space to this important phase of psychiatry —emphasizing, however, the psycho-analytic approach. Although many of the author's ideas may be challenged by the more orthodox psychiatric following, this book is recommended as a reference text in psychiatry but by no means should be considered a "bible" of this subject.

THE PATIENT AND THE WEATHER. By William F. Petersen, M. D., with the assistance of Margaret E. Milliken, S. M. Volume III, Mental and Nervous Diseases. Cloth. Price, $5.00. Pp. 375, with 192 illustrations. Ann Arbor, Michigan: Edwards Brothers, Inc., 1934.

Volume I (Parts I and II) and Volume II of this interesting series on the patient and the weather have been previously reviewed in this journal. The authors present evidence in this volume to show that psychic alterations are actually initiated by meteorological events and that there is a close association of reactive states and weather. Many case studies are given to show the interrelation of the clinical status, the blood chemistry and the meteorological environment of psychiatric patients.

The authors believe that in certain of the unstable types repeated spasm of the cerebral vessels might conceivably lead to the degeneration of a focal type and that multiple sclerosis typifies such a disease. They show that the clinical symptomatology becomes evident at times of vascular spasm. Tabes, paresis, poliomyelitis and meningitis are also considered. This volume can be recommended as an exceedingly valuable and almost indispensable reference book for those wishing to study this interesting subject.

EXERCISES AFTER DELIVERY OR OPERATION. Issued by the Obstetrical Department of the Mountainside Hospital, Montclair, New Jersey.

This paper covered pamphlet of six pages gives some excellent exercises to be used during early convalescence following delivery or after an operation. It is an instruction book for patients.